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THE
GALLERY

AN INVENTORY OF THE SERIOUS DISABILITIES OF THE URBAN RELIEF POPULATION¹

by G. ST. J. PERROTT AND HELEN C. GRIFFIN

THE question, "Who is on relief?", is one which has been of public concern for some time. This interest is natural enough in view of the fact that provision for the care of the millions of people whose own resources have been exhausted by prolonged unemployment has become a national burden of staggering proportions. The question is of interest from the standpoint both of indicating how these particular people came to need public support and of indicating something about the probable permanence of the relief problem. Accordingly, this report will present the information in regard to the prevalence of disabilities in the relief population, which was gathered in a recent survey.

In May, 1934, the Federal Emergency Relief Administration undertook a house-to-house survey of the occupational characteristics of the members of more than 165,000 relief families living in seventy-nine cities.² For each of these families the enumerators filled out a schedule on which was entered twenty-six items of information about each person in the family who had reached the age of 16 years, and a lesser amount for younger persons. The data for persons 16 or more years old included such items as age, sex, race, marital status, amount of education, employment status, present occupation (if employed), usual and alternate occupation, length of experience at usual and at alternate occupation, length of longest job with one employer, date last job at usual occupation and at any occupation ended (for the unemployed), and a notation of any serious disability which the person might have. All this information was obtained by trained enumerators in the

¹ From the Office of Statistical Investigations, United States Public Health Service.

² The interpretations in this paper are solely those of the writers.

course of an interview with some responsible member of the family.

METHOD AND SCOPE OF SURVEY

Before embarking upon a description of the disability data collected in this survey, it is pertinent that we review certain facts about the scope and methods of the survey and about other characteristics of the population studied. The seventy-nine cities in which the survey was localized were selected to give a good geographic spread and a range of city size in each geographic area. The proportion of all relief cases which were studied in each city was such that the cases studied were distributed in cities of various sizes in the same proportions as were all relief cases in urban United States. The disability data therefore should not be biased by any relationship which may exist between the degree of urbanization and the amount and types of ailments found in a population. The geographic spread of the cities assured the collection of data for both Negroes and whites, at the same time that it assured data unbiased by atypical climatic conditions. Furthermore, a wide variety of industries is to be found in the survey cities. All of these facts support the assumption that the data we are to describe are representative for the urban relief population.

Characteristics of the Surveyed Population. The relief population, of course, differs in a number of important respects from the nonrelief population. Figure 1 shows graphically some of the differences between these two groups in one city—Dayton, Ohio, in which the survey was extended to cover the entire population. The differences shown are those which might reasonably be expected.

Those groups made up of marginal workers, those who are the first to be laid off and the last to be rehired whether because of race, age, or physical condition, and those made up of low-income families naturally form a larger proportion of the

relief than of the nonrelief population. All of these factors are related to health. It is to be anticipated, therefore, that the relief population will have a rather high disability rate.

Survey Technique. In considering the results of the F. E. R. A. survey, the method of obtaining the information must be borne in mind. The data were obtained in the course of interviews with a responsible member of each household, by an enumerator who had been given a brief period of preliminary training and provided with a set of written instructions.

The disability question on the schedule was stated as follows: "Has person any serious physical or mental disability? (Specify.)" The disability data are therefore the result of the mass inter-

pretation of this question as asked by the enumerator. Both written and verbal instructions to the enumerator stressed the fact that only serious physical or mental disabilities were to be recorded, and a list of the principal types of disabilities was given him in order to facilitate recognition and recording. A grave difficulty, however, is presented by the uncertainty of what constitutes a serious physical or mental disability. Physical impairment shades

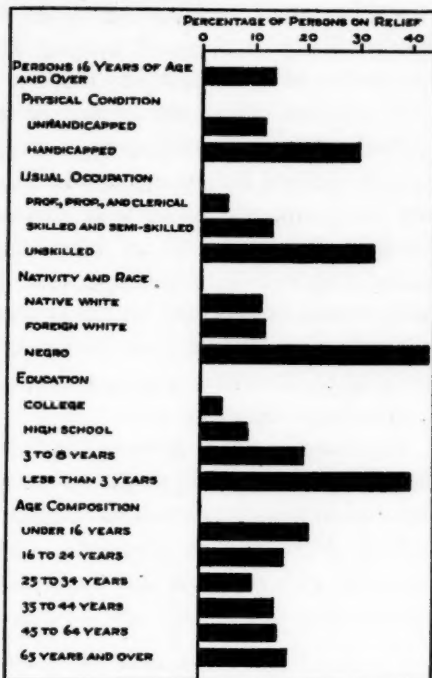


Fig. 1. Percentage on relief for groups of persons classified by physical condition, usual occupation, nativity and race, education, and age, in Dayton, Ohio, July, 1934.

off from normality on the one side to bed-ridden invalidity on the other. Since the main purpose of the survey was to discover employability, enumerators were asked to evaluate the seriousness of a disability according to its effect on the individual's chances for procuring and keeping a job. An impairment did not have to be accompanied by illness to be recorded, but did have to be chronic.³ While the opinion of the field supervisors varies as to the degree of handicap represented by the reported disabilities, the general feeling seems to be that only handicaps of a serious and permanent nature were recorded. When more than one disability was present in an individual, the enumerator was instructed to record the principal one. The information collected was relative to disability on the day of the visit; thus the data show the prevalence and not the incidence of impairments. Questions as to disabilities were asked only in regard to persons 16 years of age and over.

Organization of the Report. The F. E. R. A. disability data will be presented according to the following outline: (1) the prevalence of serious disability in the relief population, its total amount, and its distribution in geographic areas; (2) the correlation of disability with race, sex, age, employment status, occupation, and relief status; and (3) the specific diagnoses recorded.

THE PREVALENCE OF SERIOUS DISABILITIES

Total Amount of Disability in the Relief Population. Of the 450,000 persons 16 years of age and over, enumerated in the seventy-nine cities, 21.2 per cent reported a serious physical or mental disability. Is this figure too high or too low? The enu-

³ The instructions to enumerators on this point read, "Enter physical or mental disabilities which are apparent to the interviewer or which the person interviewed reports on being questioned and which might be a handicap to a worker.—"

"Enter the name of any apparent or obvious permanent physical or mental defect sufficient to handicap the person in procuring work, such as: infantile paralysis, loss of one or both arms or legs, marked mental defect or nervous condition. Enter the name of any chronic or periodic illness to which the person is subject and which is of sufficiently serious nature to be likely to interfere with his getting or keeping work, such as, tuberculosis, heart disease, epilepsy."

merators were instructed to explain to their informant that the survey was in no way connected with the relief status of the household, and that the data would be kept confidential. Still it is likely that some people were fearful of losing opportunities to be placed on work projects and accordingly suppressed accounts of their illnesses, while others may have exaggerated minor ailments or reported nonexistent ones by way of rationalizing their position on the relief rolls. It is reasonable, however, to assume that these opposing errors of over-reporting and under-reporting offset each other in the mass data.

This assumption is substantiated by the results of a series of medical examinations given to 3,342 individuals for whom schedules were taken in Chicago, Illinois. These examinations⁴ were given in connection with assigning relief clients to work projects. The physicians found 20.0 per cent seriously handicapped by their physical condition, whereas 16.7 per cent of those examined had reported themselves as handicapped.

Disability and Geographic Distribution. The per cent of persons reporting disabilities varied from one geographic area to the next as follows:

<i>All Areas</i>	21.2
Eastern	17.8
Central	23.5
Southern	24.3
Western	18.7

These differences are not due to differences between the sections in race and age composition, for adjustment to the age and race composition of all areas makes little difference in the rates which become: Eastern area, 19.5 per cent; Central area, 22.8 per cent; Southern area, 25.6 per cent; and Western area, 18.3 per cent. The differences in rates might be thought to be due to differences

⁴ Since this series of work-relief medical examinations will be referred to from time to time throughout this paper in connection with the interpretation of the survey data, a few details as to the purpose and method of these examinations are given in the Appendix, p. 240.

in occupational composition, except that, if this factor were responsible, the sections should be expected to differ in types as well as in the amount of disability reported. This they do not do. The Southern area, for example, which reported the highest rate for all disabilities also exhibited the highest rate for specific types of disability such as eye defects, respiratory diseases, and orthopedic deficiencies. (See Table 1.) It is more likely that regional differences in the type of cases accepted for relief, and in the thoroughness and care with which the survey was conducted are responsible for the geographic variations in the proportion of persons who are handicapped by physical and mental disability.

THE RELATION BETWEEN DISABILITY AND RACE, SEX, AGE, AND VARIOUS
SOCIAL AND ECONOMIC INDICES

Disability and Sex and Race. Surprisingly, Negroes in the relief

Table 1. Number and proportion of persons 16 years of age and over reporting disabilities, classified by the type of disability reported and by survey area.

NATURE OF DISABILITY	ALL AREAS	EASTERN	CENTRAL	SOUTHERN	WESTERN
TOTAL, ALL PERSONS	447,874	143,572	149,020	91,430	63,852
TOTAL HANDICAPPED	94,732	25,576	34,973	22,237	11,946
	RATE PER 1,000 PERSONS				
<i>All Disabilities:</i> Crude	211.5	178.1	234.7	243.2	187.1
Adjusted	—	194.5	228.3	255.9	183.3
Orthopedic	37.0	30.8	40.9	40.7	36.2
Hernia	11.2	9.6	14.9	8.9	9.7
Eye defects	13.4	10.9	14.4	16.9	11.9
Impaired hearing	6.3	5.5	7.8	5.2	6.5
Mental and nervous	13.1	13.1	13.9	14.5	9.9
Respiratory	15.6	13.0	17.0	17.6	15.2
Digestive	11.6	10.2	13.5	12.9	8.6
Rheumatism	20.2	17.5	22.8	23.4	15.5
Heart and circulatory	33.2	30.6	35.4	39.3	25.1
Kidney and bladder	6.4	4.8	6.5	10.3	4.6
Cancer and tumor	3.6	2.9	4.1	4.2	3.2
Diabetes	3.0	3.2	3.7	2.2	1.9
Senility	20.9	15.6	21.4	25.9	24.2
All other	15.9	10.4	18.4	21.2	14.4

population report but a slightly higher proportion of their numbers as suffering from serious disabilities than do white persons. Negro males reported less disability than white males, and Negro females more than white females. "Other races" reported the lowest disability rate for either sex.⁵ Women uniformly reported more disability than men. The per cent reporting serious disability varies with race and sex, thus:

	Both Sexes	Male	Female
All Races	21.2	20.2	22.2
White	21.1	20.7	21.6
Negro	22.4	18.3	25.6
Other	13.5	12.7	14.3

Disability and Age. As should be expected, the proportion of persons reporting handicaps increases with age. Figure 2 and Appendix Table 2 show the rapid increase in prevalence of all disabilities and of specific types of defect with age. Orthopedic defects, the degenerative diseases,⁶ rheumatism, eye and ear defects, and senility naturally increase continuously with age since they represent the cumulative result⁷ of the impact of the environment on the individual (as in the orthopedic cases), or the wearing out of the body mechanism as in the degenerative diseases. Tuberculosis, however, and diseases of the digestive system show a peak in the age group 55-64 years. The data indicate that in some instances the prevalence of an impairment between the age groups 25-34 and 55-64 does not rise as sharply with age as in others. Thus, rheumatism is reported by 6.9 persons per 1,000 in the former class and by 54.1 in the latter, an eight-fold increase.

⁵ The rate for "other races," both sexes, is 13.5, and when adjusted to the age composition of "all races" in the relief population is 15 per cent. Similar adjustment for "Negroes" gives a figure of 25 per cent. Thus age differences are not responsible for the lower rate of impairment reported by the other races. Language, however, and lack of cooperativeness probably account for some of the disparity.

⁶ Here are grouped heart disease, high blood pressure and arteriosclerosis, kidney and bladder diseases, cancers and tumors, and diabetes. The classification was made for purposes of convenience in handling the age distribution of disabilities.

⁷ Except in instances of fatality or recovery from the disease.

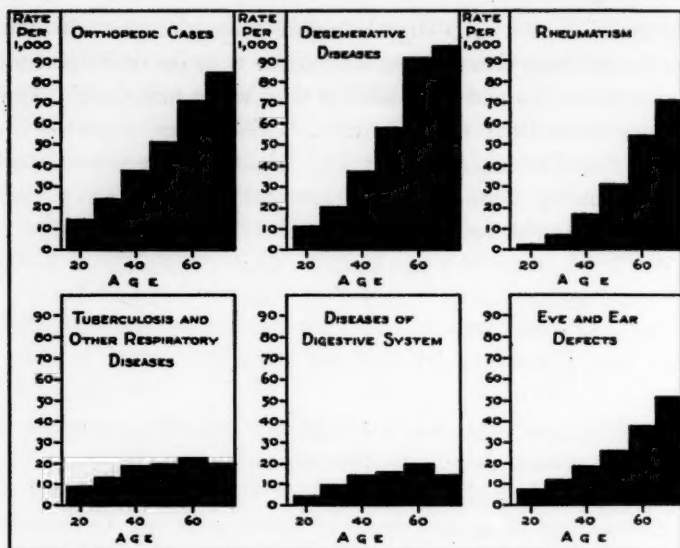


Fig. 2. AGE PREVALENCE OF DISABILITIES. Number with disabilities per 1,000 relief population in specific age groups (16 years of age and over), disabilities classified in broad diagnosis groups, for all areas in the Occupational Characteristics survey of the urban relief population, May, 1934.

The orthopedic cases, on the other hand, display a three-fold increase between the two classes, the degenerative diseases a four-fold increase, eye and ear defects a three-fold increase, and digestive diseases a two-fold increase. The respiratory diseases (including tuberculosis) exhibit the greatest uniformity in frequency throughout the age groups. For these diseases the figure reported by the 25-34 year group is 13.5 cases per 1,000 while the 55-64 year group reports 22.2 cases per 1,000, an increase of 64 per cent.

Disability and Employment Status. All persons 16 or more years of age have been grouped into three major employment classes: (1) workers, persons 16 to 64 years old who are either employed or seeking work; (2) persons 16 to 64 years old who are not seeking work; and (3) persons who have reached the age of

65 years. Class 1 is subdivided according to work status, the employed, the work-seekers who are employed on work relief projects, and the work-seekers who are entirely unemployed. The percentage of persons reporting disabilities was 13.5 in class 1, 26.5 in class 2, and 68.5 in class 3. The high rate for the older age group (class 3) is to be expected. The two-fold excess of disability in class 2 over class 1 is related in part to age differences between the two groups, and in part to the fact that physical disability is a major factor in placing an individual in the group not seeking work (class 2).

Figure 3, showing the prevalence of disabilities at each age level, supports this interpretation. The same upward trend of the disability rate with age as found in the preceding section is found among workers of both sexes and among housewives,⁸ but among all non-work-seekers beyond the school ages (16-24), the disability rate is nearly 100 per cent at each age.

Among the workers, work relief employees report the smallest proportion with disabilities, and those who are without work of any kind the highest proportion. (See Figure 4 and Table 2.)

Among workers, the highest per cent of disability is reported

⁸ The data for Figure 3 were taken from a special tabulation of a 5 per cent sample of the schedules, since it was not possible to separate housewives from other non-work-seekers in the final tabulation. This figure undoubtedly represents closely the situation that would have been shown by tabulating 100 per cent of the schedules, since other data drawn from the 5 per cent tabulation closely parallel the final results.

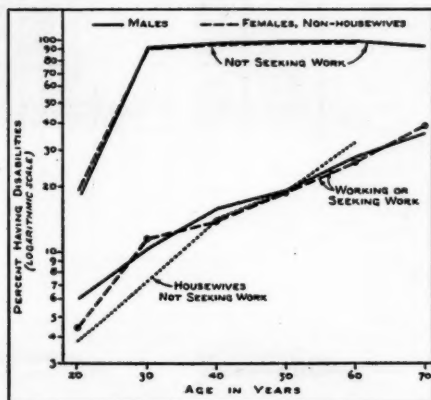


Fig. 3. DISABILITY AND WORK STATUS AT VARIOUS AGES. Age prevalence of disabilities among relief persons 16 years of age and over, classified by sex and employment status. (Based on a 5 per cent sample of schedules from the survey of Occupational Characteristics of the urban relief population, May, 1934.)

RACE AND SEX	TOTAL ALL CLASSES	PERSONS 16-64 YEARS OF AGE						65 YEARS AND OVER
		Total 16-64 Years	Employed or Seeking Work				Not Seek- ing Work ¹	
			Total	Non- relief Work	Work Relief	Seek- ing Work		
ALL RACES	21.2	18.0	13.5	12.4	11.3	14.5	26.5	68.5
Male	20.2	17.2	14.4	13.2	11.5	16.1	46.6	63.5
Female	22.2	18.8	11.5	11.3	9.1	11.7	23.6	73.7
White	21.1	18.0	14.1	12.6	11.7	15.4	24.7	67.1
Male	20.7	17.7	15.2	13.6	12.0	17.1	45.0	63.1
Female	21.6	18.2	11.1	10.6	8.6	11.4	21.9	71.6
Negro	22.4	19.3	12.1	12.3	9.6	12.7	41.2	75.3
Male	18.3	15.5	11.5	10.8	9.4	12.5	56.2	65.9
Female	25.6	22.3	12.9	13.0	13.6	12.8	38.4	82.7
Other Races	13.5	10.6	6.8	6.5	5.7	7.1	16.8	73.8
Male	12.7	10.1	7.3	7.6	5.9	7.7	38.2	66.9
Female	14.3	11.1	5.6	4.9	3.7	5.9	14.0	80.1

¹ The data for women are from the final tabulation and are for all women not seeking work, including housewives.

Table 2. Prevalence of disabilities among urban relief population 16 years of age and over, classified by race, sex, and by employment status in the group 16-64 years of age. (Per cent of persons reporting disabilities.)

by white males, and the next highest by Negro females. Among whites, men report a considerably higher rate than women in each of the subgroups composing this employment class. The rates for Negro males and females show considerable resemblance.

The highest disability rate among those not seeking work is reported by Negro males and the next highest by white males, women consistently reporting a lower prevalence of handicaps than men. The lower disability rate for women is the result of influences other than physical and mental disabilities which operate to keep women out of the labor market, notably the status of housewife. The per cent of those not seeking work who are not seeking work on account of disabilities makes this evident.⁹

⁹ The percentages are obtained by dividing the number of persons 25 to 64 years old who are not seeking work on account of a physical or mental disability by the total number of non-work-seekers 25 to 64 years old. Other non-work-seekers also have disabilities, but their disabilities are not the significant factor in their failure to seek work. The non-work-seekers under 25 years of age have been omitted because so high a proportion of them were not seeking work on account of school attendance that their work status has not the same significance as that of older persons.

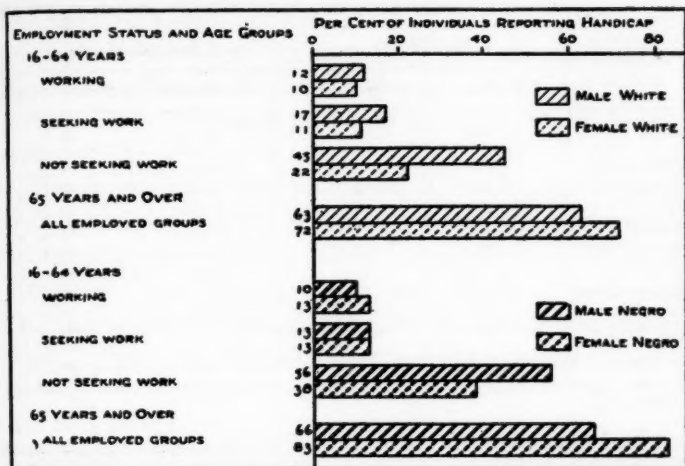


Fig. 4. DISABILITY AND EMPLOYMENT STATUS. Percentage of persons with disabilities for groups of persons on relief 16 years of age and over classified according to specific age, sex and employment status, for all areas in the Occupational Characteristics survey of the urban relief population, May, 1934.

	Males	Females
White	95	48
Negro	97	77 ¹⁰

Disability and Occupational Class. Impairment rates in the relief population vary less from one socio-economic type of occupation to another than would be expected from a knowledge of the general population. They display, in fact, with the one exception of a rate of 18 per cent (adjusted for age) in the proprietary group, a remarkable uniformity. (See Table 3.) In the nonrelief population, however, it is probable that there is considerable gradation in the proportion of handicapped persons from a high among unskilled laborers to a low in the white-collar groups. This view is confirmed by the results of the Dayton survey (Table 6). Here the proportion of handicapped persons among

¹⁰ It is a well-known fact that custom bars many less Negro than white housewives from the labor market.

SOCIO-ECONOMIC STATUS	ALL PERSONS		PERCENTAGE OF PERSONS REPORTING HANDICAP	
	Number	Per Cent	Crude Rate	Adjusted for Age ¹
TOTAL	275,185	100.0	13.6	13.7
Professional	5,827	2.1	12.4	12.3
Proprietary	8,397	3.1	22.8	18.1
Clerical	28,599	10.4	11.6	14.0
Skilled	46,219	16.8	15.5	13.2
Semi-skilled	70,814	25.7	14.2	14.9
Unskilled	95,185	34.6	13.7	13.2
Never worked	20,144	7.3	5.7	10.7

¹ Adjusted to the age schedule of the gainfully employed, United States, 1930, aged 16-64 years.

Table 3. Proportion of relief persons 16-64 years of age, working or seeking work, reporting disability, classified according to socio-economic type of usual occupation.

unskilled laborers in the nonrelief population was twice as great as among the professional group. The condition of the relief population is, then, the reverse of normal.

The unusual uniformity within the relief population may result from a greater need for rationalization on the part of white-collar people since theirs is the greater loss of social status. A more likely explanation, however, appears to be that among the white-collar occupations, illness and physical impairments are relatively a more frequent cause of dependency than among laborers. Among unskilled laborers where income is always low and adaptability to new conditions and suitability for new or changed employment is limited, reasons of a purely economic nature often

Table 4. Per cent of examined population with serious disabilities, classified by socio-economic type of usual occupation, and by source of information. Chicago.

Socio-economic Type of Occupation	Occupational Characteristics Schedules	Medical Exams ¹
ALL OCCUPATIONS	16.6	20.1
Professional	16.4	22.8
Proprietary	28.2	28.5
Clerical	17.0	16.7
Skilled	17.0	18.6
Semi-skilled	15.3	20.0
Unskilled	15.4	21.1

¹ "Serious disability" in the sense of assignment to classes C and D. (See Appendix.)

put the family on relief, but among the more adaptable white-collar classes the family can more frequently meet new economic conditions unless handicapped by physical impairment.

For a more detailed occupational classification, see Appendix Table 3.

The section of the relief population to which medical examinations were given was too homogeneous with respect to race, sex, and employment status to permit an analysis of differentials in impairment rates associated with these factors. The physicians' findings can be related to occupational differentials, however. Table 4 shows what similarity there is in the relationships between disability and occupation, as found by a house-to-house survey, and by a series of physical examinations.

Disability and Relief Status. In Dayton, Ohio, where the occu-

Table 5. Per cent of the population of Dayton, Ohio, July, 1934, reporting disabilities, classified according to relief status, employment status, race, and sex.

AGE GROUP EMPLOYMENT STATUS AND SEX	ALL RACES		WHITE		NEGRO	
	Relief	Nonrelief	Relief	Nonrelief	Relief	Nonrelief
TOTAL, ALL CLASSES	21.1	7.9	22.1	7.8	18.0	9.3
Male	22.3	8.5	24.0	8.5	17.3	9.1
Female	19.9	7.3	20.3	7.1	18.6	9.5
Total 16-64 years	15.7	4.8	16.2	4.6	14.4	7.3
Male	17.7	5.9	18.9	5.7	14.1	7.8
Female	13.8	3.8	13.4	3.6	14.8	6.9
Employed or seeking work	11.0	3.6	12.3	3.6	8.2	4.0
Male	13.2	4.4	14.5	4.4	9.7	4.5
Female	5.6	1.6	5.5	1.5	5.7	3.1
Not seeking work	23.0	6.6	21.7	6.2	27.6	15.4
Male	49.0	24.2	50.3	23.0	45.3	41.0
Female	18.1	4.8	16.6	4.5	23.6	10.9
65 years and over	66.9	41.4	65.2	41.0	78.1	54.9
Male	63.5	41.2	63.1	41.2	65.5	43.5
Female	70.1	41.4	67.0	0.84	93.6	64.3

pational survey was made for the entire population of the City, both relief and nonrelief, a considerable excess of disabilities is found throughout the entire relief group.¹¹ In Table 5 it can be

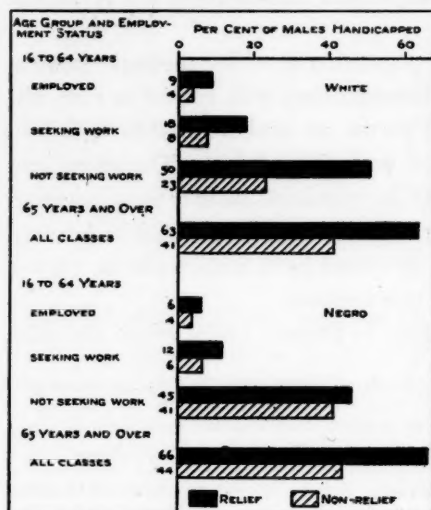


Fig. 5. DISABILITY AND RELIEF STATUS. Percentage with disabilities for males classified by color, relief status, age, and employment status from the survey in Dayton, Ohio, July, 1934.

cept that among Negroes the ratio of impairments in the relief and nonrelief populations drops to 2 to 1, and that among the Negroes who are not seeking work the rates are almost equal for relief and nonrelief persons. (Figure 5.)

Although in the nonrelief population, particularly among persons of working age, more Negroes than whites report disabilities, the reverse is true in the relief population. The peculiar disability status of the Negro on relief can be understood when we

seen that whereas 21.1 per cent of the relief group (this figure coincides with that of the seventy-nine city average of the occupational survey) reported disabilities, only 7.9 per cent in the nonrelief group did. In other words, almost three times as many people receiving relief considered themselves handicapped by some physical impairment as their self-supporting neighbors. The same relation is found in subdivisions of the relief and nonrelief populations; ex-

¹¹ The tabulations of the survey are based on a random sample of 19 per cent of the total number of schedules collected and include records of 53,130 persons.

consider that in Dayton, 11 per cent of whites between 16 and 64 years of age and 43 per cent of Negroes were being assisted at the time of the survey. Since Negroes occupy a lower economic status than whites, and since they are somewhat more apt to become unemployed than whites—by virtue of being Negroes—a larger proportion of them are receiving relief. Hence, although a larger proportion of all Negroes than of all whites may become dependent because of disability, the number of Negroes who are dependent because of disability is a smaller proportion of the total number receiving relief, because other factors producing unemployment, namely, occupational level and race, contribute to make the total number on relief so large.

When wage-earners are classified by socio-economic type of usual occupation evidence of the same type of selective process is again the most noteworthy aspect of the data. Unskilled white male laborers not on relief, for example, report a prevalence of disabilities about 65 per cent higher than that reported by the proprietary group, whereas for those on relief the difference is only about 20 per cent. (*See Table 6.*) This fact, together with the fact that 33 per cent of the unskilled group in contrast to 4 per cent

Table 6. Prevalence of disabilities among all workers and white male workers in Dayton, Ohio, classified by socio-economic type of usual occupation.

SOCIO-ECONOMIC CLASS	PER CENT REPORTING DISABILITIES				POPULATION			
	All Races Both Sexes		White Males		All Races Both Sexes		White Males	
	Relief	Non-relief	Relief	Non-relief	Relief	Non-relief	Relief	Non-relief
ALL CLASSES	10.7	3.6	13.3	4.1	3,776	24,409	2,047	17,243
Professional	5.3	2.3	3.1	2.8	83	1,667	33	1,025
Proprietary	11.5	3.5	12.4	3.6	77	1,867	61	1,690
Clerical	10.5	2.9	12.5	3.8	363	5,950	216	3,460
Skilled	12.8	4.1	12.5	4.1	890	4,817	761	4,621
Semi-skilled	10.9	3.8	14.2	4.4	1,093	7,525	661	5,551
Unskilled	9.2	4.5	14.8	5.9	1,270	2,583	315	896

of the proprietary group were on relief in Dayton, denotes that unskilled laborers need relief for many other reasons besides physical impairment, whereas physical disability is one of a fewer number of hazards to which white-collar workers are subject.

The relative prevalence of disabilities in the several occupational groups for all workers does not present as clear a picture as the prevalence among white males does, due to the existence of racial differentials in impairment rates and to the greater proportion of Negroes in the relief than in the general population.

Further tabulations also indicate that the relief-nonrelief differentials found here are due chiefly to differences in economic status. This conclusion is derived from the fact that the difference between the disability rates, specific for sex and race, in the relief and nonrelief populations becomes very small when the rates are adjusted for income and age. The rates (16-64 years) adjusted for age and family income compare with the crude rates as follows:

<i>Sex and Race</i>	<i>Adjusted Rates</i>		<i>Crude Rates</i>	
	<i>Relief</i>	<i>Nonrelief</i>	<i>Relief</i>	<i>Nonrelief</i>
<i>White</i>	8.0	6.0	16.2	4.6
Male	9.3	7.7	18.9	5.7
Female	6.8	4.4	13.4	3.6
<i>Negro and Others</i>	7.1	8.0	14.4	7.3
Male	6.9	8.2	14.1	7.8
Female	7.3	7.9	14.8	6.9

Thus, making an adjustment for differences in the incomes of relief and nonrelief families cuts the difference between the relief and nonrelief disability rates from an excess in the relief population of 250 per cent to an excess of only 33 per cent for whites, and for Negroes from an excess of 97 per cent to a deficiency of 13 per cent. This correction for differences in disability rates which are associated with differences in income level is a valid one because disability rates increase regularly with decreases

in income within both the relief and nonrelief populations. (See Appendix Table 4.) It is, therefore, safe to conclude that the disproportionately large number of persons on the relief rolls who are vocationally handicapped by physical and mental disabilities is associated more closely with their low incomes than with their relief status *per se*.

DIAGNOSES REPORTED IN THE OCCUPATIONAL CHARACTERISTICS SURVEY

Specific Types of Disability Reported. When the material is further analyzed as to prevalence of specific types of impairments, the following information is obtained: Among males, orthopedic cases¹² constitute the most important source of handicap with a rate of 49 cases per 1,000 persons, which means that 5 per cent of the male relief population 16 years of age and over have this type of handicap. Heart, circulatory, and blood diseases rank next with a rate of 24 cases per 1,000. Hernia handicaps 19 out of every 1,000 persons. Next in order of descending frequency are respiratory diseases, including tuberculosis; rheumatism; eye defects; infirmities of old

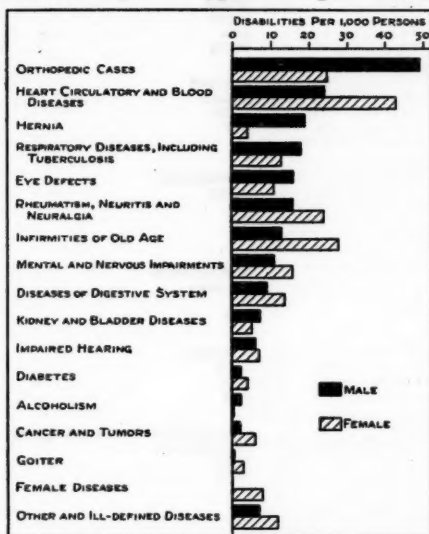


Fig. 6. SEX AND THE PREVALENCE OF BROAD CATEGORIES OF DISABILITIES. Number with disabilities per 1,000 relief population 16 years of age and over, classified by sex, and disabilities classified in broad diagnosis groups for all areas in the Occupational Characteristics survey of the urban relief population, May, 1934.

¹² "Orthopedic cases" and "orthopedic defects" are used interchangeably through the paper and refer to results of amputation, paralysis, congenital defects, or injury of the trunk or limbs, except hernia and eye and ear defects, which are listed separately.

age; mental and nervous diseases; diseases of the digestive system; impaired hearing; and kidney and bladder diseases.

Among females, the heart, circulatory, and blood group of diseases is the most prevalent source of disability with a rate of 43 cases per 1,000 females 16 years of age and over. The group of indefinite impairments classified as infirmities of old age, with a



Fig. 7. PREVALENCE OF SPECIFIC TYPES OF DISABILITIES. Number with disabilities per 1,000 relief persons 16 years of age and over, disabilities classified in detailed diagnosis groups, for all areas in the Occupational Characteristics survey of the urban relief population, May, 1934.

facts included. (Further detail is shown in Appendix Table 1.)

Specific Types of Disability and Employment Status. In Figure 8 is shown the relative importance of various types of handicap

rate of 28 cases per 1,000, ranks next in frequency. The third group is that of orthopedic cases (which ranked first as a cause of disability among males) with a rate of 25 cases per 1,000 women, while the group comprising rheumatism, neuritis and neuralgia, with a rate of 24 cases per 1,000, ranks fourth. The importance of other diseases can be seen in Figure 6.

In Figure 7, some of the broad categories shown in Figure 6 have been subdivided to show in more detail the nature and frequency of the defects included.

as reasons for not seeking work, for males between 16 and 64 years of age. The bars represent the ratio of males not seeking work because of a specific handicap to all males reporting the handicap. The chart indicates that total blindness, paralysis, insanity, cancer, and senility were considered very serious by the informants since from 65 to 78 per cent of all persons who reported having these disabilities therefore felt unable to search for employment. Defects that are considered of relatively minor importance are impaired arms, hands, feet, and fingers, defective vision or blindness in one eye, speech defects, and impaired hearing. Less than 10 per cent of the persons reporting these handicaps were prevented from seeking work because of the disability.

Since the various types of disabilities differ in the extent to which they keep people from looking for jobs, the configuration of disabilities reported by persons 16 to 64 years old who are working or seeking work differs somewhat from that for the population group not seeking work in the same age period. (See Table 7.)



Fig. 8. VOCATIONAL SIGNIFICANCE OF VARIOUS DISABILITIES. Percentage that males not seeking work because of a specific handicap were of all males 16 to 64 years of age who reported the handicap.

Types of Disabilities Found by Examining Physicians. For the 3,432 applicants for work relief jobs who were given physical examinations in Chicago, Illinois, it is possible to compare the prevalence in the examined population of serious cases of specific disabilities, as obtained from self-reports, and as discovered upon examination. The medical report form was so drawn up that in a good many cases the examining physicians found and recorded more than one disability. In these cases of multiple disability, one had to be selected for tabulation if the results were to be at all comparable to those obtained from the survey, since the Occupational Characteristics schedule permitted entry of only one disability for each person. A disability was selected for tabulation first, according to its correspondence to the one entered on the survey schedule, and next, when there was no correspondence, according to the rules of the *Manual of the Joint Causes of Death*. It was believed that these were the best criteria to use since the schedule entries were limited

Table 7. Rank order of disability according to its prevalence among persons working or seeking work and among those not seeking work.

NATURE OF DISABILITY	MALES		FEMALES	
	Working or Seeking Work	Not Seeking Work	Working or Seeking Work	Not Seeking Work
Orthopedic cases	1	1	2	1
Hernia	2	8	12	13
Heart, blood, and circulatory diseases	3	3	1	1
Eye defects	4	6	7	7
Respiratory diseases (including tuberculosis)	5	2	6	6
Rheumatism, neuritis, and neuralgia	6	5	3	3
Diseases of the digestive system	7	7	4	5
Mental and nervous impairments	8	4	5	4
Impaired hearing	9	12	8	11
Kidney diseases	10	9	9	9
Alcoholism	11	14	15	15
Diabetes	12	13	13	12
Cancer and other tumors	13	11	10	10
Infirmities of old age	14	10	14	8
Goiter	15	15	11	14
Ill-defined diseases	—	—	—	—

to serious disabilities (or the most serious in cases of multiple disabilities), while the medical reports were not so limited and often did not indicate the severity of the individual conditions noted.

It is quite evident from Table 8 that the diagnosis varies with the source of the information. The difference in the prevalence of the separate diagnoses is so great, indeed, that in all cases but three it exceeds the actual prevalence as shown by one or the other of the sources.

For the most part, the differences shown in Table 8 are of the sort that should be expected. In general, those diagnoses which depend for recognition upon examination with technical equipment (e.g., degenerative diseases [most of which may be classified as heart ailments], and hernia) are low on the survey schedules, while those which require good case histories but are rather

Table 8. Comparison of per cent of persons medically examined who were seriously affected by certain disabilities as shown by reports on Occupational Characteristics schedules and by reports of medical examinations.¹

TYPE OF DISABILITY	REPORTED ON		DIFFERENCE ²
	Survey Schedules	Medical Blanks	
ALL CLASSES	16.7	20.0	-3.3
Orthopedic	4.2	1.9	2.3
Hernia	2.0	4.4	-2.4
Eye	1.5	1.5	—
Ear	.7	.3	.4
Mental and nervous	.9	0.0	.9
Respiratory	1.5	.4	1.1
Digestive	1.0	.1	.9
Rheumatism, neuritis, etc.	1.5	.5	1.0
Degenerative diseases	1.9	7.6	-5.7
Other circulatory diseases	.4	.7	-.3
Senility	0.0	.5	-.5
Teeth and gums	.1	.1	—
Venereal diseases	.1	1.1	-1.0
Skin diseases	.2	.1	.1
All others	.7	.2	.5

¹ Per cent of total rated by physicians as fit for light or no work and as having a given disability (only one disability per case allowed).

² Difference: survey data minus medical data.

easily recognized by the sufferers (such as digestive disorders and mental and nervous troubles) are high on the survey schedules and low on the medical report forms.

It is probable that the chief value of the diagnosis information from this study is to indicate what the relief population thinks is wrong with it. Likewise it is probable that the information drawn from the medical examinations is an inadequate statement of the disabilities of the examinees. For one thing, diagnostic standards vary so widely that two independent medical diagnoses of the same individual often result in quite different reports.¹³ For another, the absence of a thorough case history would make it impossible to diagnose some kinds of conditions. The differences in the amount of disability from various diagnoses revealed by self-reports and medical examination suggest that the total amount of disability found by both methods was some understatement of the prevalence of serious disabilities.

The foregoing discussion of discrepancies in diagnoses drawn from different sources leads to the conclusion that different techniques than used in this survey or in the series of medical examinations, are necessary if accurate information on physical handicaps is to be obtained. A later paper will analyze these discrepancies in greater detail, and will suggest a survey technique which shows promise of yielding more reliable disability data.

SUMMARY

In the F.E.R.A. survey, 21 per cent of all relief persons 16 years of age and over reported handicaps which they considered serious. In the group of wage-earning age, that is, 16 to 64 years, 12 per cent of those who were employed at nonrelief work and 11 per cent of those who were employed on work projects had disabilities, 15 per cent of those who were seeking work, and 27

¹³ Buck, C. E.: The Standardization of School Medical Inspection. *American Journal of Public Health*, December, 1923, xiii, No. 12, p. 1021.

per cent of those who were not seeking work. (This latter proportion would have been much higher if it had been possible to exclude from this class women who were not seeking work because of home duties.) Of the group 65 years of age and over, 68 per cent reported a serious physical or mental disability.

The usual racial and occupational differentials in impairment rates are not found in the relief population. Thus, white males on relief show a higher prevalence of disabilities than Negroes, and relief persons in the professional and proprietary groups report as high a proportion of handicaps as those in other occupations. This is evidence that physical impairment is an important cause of unemployment and dependency among groups of persons that would otherwise be likely to remain employed by reason of favorable racial or occupational characteristics.

Comparison of the data for relief with that for nonrelief persons indicates a concentration of handicapped persons in the relief population. In Dayton, Ohio, the occupational survey included nonrelief as well as relief persons and showed that the prevalence of disabilities among relief persons was three times as great as among nonrelief persons. This differential was associated chiefly with differences in the economic status of the two groups.

APPENDIX

Description of Medical Examination Given in Chicago

Physical examinations were given to 3,432 individuals who had been included in the Occupational Characteristics survey under the auspices of the Illinois Work Relief Administration as a preliminary to placing them on work projects. The examining physicians were instructed "to bear constantly in mind that the spirit of this survey is to adapt applicants to work and not to exclude them from it. The abnormalities disclosed in the course of the examination must be noted for the protection of the applicant against assign-

(Continued on page 240)

Appendix Table 1. Prevalence of disabilities classified by specific diagnoses, among the relief population 16 years of age and over, classified by sex and age.

NATURE OF DISABILITY	BOTH SEXES			MALES			FEMALES		
	Total 16 Years and Over	16-64 Years	65 Years and Over	Total 16 Years and Over	16-64 Years	65 Years and Over	Total 16 Years and Over	16-64 Years	65 Years and Over
TOTAL POPULATION ¹	447,874	419,919	27,955	224,852	210,507	14,345	223,022	209,412	13,610
HANDICAPPED PERSONS	94,732	75,584	19,148	45,329	36,217	9,112	49,403	39,367	10,036
HANDICAPPED PERSONS PER 1,000 POPULATION									
ALL DISABILITIES	211.5	180.0	685.0	201.6	172.1	635.2	221.5	188.0	737.4
<i>Orthopedic Cases</i>	37.0	33.8	84.2	49.3	45.4	107.3	24.5	22.2	59.8
Trunk	6.7	6.3	13.5	8.6	8.1	16.4	4.8	4.4	10.4
Head and face	0.6	0.6	0.7	0.8	0.8	1.1	0.3	0.3	0.4
Arm	3.1	3.0	5.2	4.3	4.1	7.1	1.9	1.8	3.2
Hand	2.0	1.9	3.9	2.7	2.5	5.9	1.3	1.3	1.8
Fingers lost or impaired	3.4	3.4	4.0	6.3	6.2	7.0	0.6	0.6	0.9
Leg	9.1	8.3	21.3	12.4	11.4	27.3	5.9	5.4	14.9
Foot and ankle	3.6	3.3	5.2	4.4	4.2	7.0	2.5	2.4	3.2
Other and ill-defined injuries and defects	8.5	7.0	30.4	9.8	8.1	35.5	7.2	6.0	25.0
<i>Hernia</i>	11.2	10.0	30.1	18.8	16.5	52.0	3.7	3.4	6.9
<i>Eye Defects</i>	13.4	11.9	35.9	16.2	14.5	40.4	10.6	9.3	31.2
Lost one eye	1.5	1.4	2.5	2.5	2.4	3.8	0.5	0.4	1.2
Blind one eye	2.1	1.9	4.2	3.0	2.9	5.8	1.1	1.0	2.5
Blind both eyes	1.7	1.2	10.0	2.0	1.4	11.2	1.5	1.0	8.6
Cataract, one eye	3.0	2.1	10.6	2.9	2.3	11.6	2.2	1.9	9.5
Cataract, both eyes	0.4	0.3	1.1	0.4	0.3	1.3	0.3	0.3	1.0
Defective vision, vaguely described	0.4	0.3	1.1	0.4	0.3	1.2	0.4	0.3	1.1
Other eye impairment and diseases	3.9	4.3	5.7	4.5	4.5	4.9	4.2	4.0	6.5
<i>Impaired Hearing</i>	0.4	0.4	0.7	0.5	0.4	0.6	0.4	0.4	0.8
Deaf, total	6.3	5.6	15.2	7.2	6.4	18.1	5.5	5.1	12.1
Deaf, partial	0.2	0.2	0.5	0.2	0.2	0.7	0.3	0.2	0.4
Deaf and dumb	5.0	4.3	13.8	5.8	5.0	16.3	4.1	3.8	11.0
Other ear impairments and diseases	0.8	0.8	0.8	0.8	0.8	1.0	0.9	0.9	0.5
	0.3	0.3	0.1	0.4	0.4	0.1	0.2	0.2	0.2
<i>Mental and Nervous Impairments</i>	13.2	13.3	12.2	10.7	10.8	10.0	15.7	15.8	14.5
Insanity	1.2	1.1	2.3	1.1	1.1	2.1	1.2	1.1	2.4
Nervous disorders not specified	6.7	6.8	6.6	4.0	3.9	5.2	9.5	9.6	8.4
Mental deficiency	2.9	3.0	1.9	2.9	3.1	1.3	2.8	2.9	2.5
Epilepsy	1.5	1.5	0.8	1.7	1.7	0.8	1.3	1.3	0.7
Speech defects	0.5	0.5	0.3	0.7	0.7	0.3	0.4	0.4	0.2
Other nervous and mental impairments	0.4	0.4	0.3	0.3	0.3	0.3	0.5	0.5	0.3
<i>Respiratory Diseases</i>	15.6	15.3	19.5	18.0	17.6	23.9	13.1	13.0	14.8
Tuberculosis, all forms	6.0	6.2	3.4	7.3	7.5	4.2	4.9	4.9	2.4
Other lung diseases	1.6	1.6	0.6	2.0	2.1	1.1	1.1	1.2	0.2
Asthma and hay fever	4.7	4.3	11.4	5.1	4.5	13.1	4.3	4.0	9.5
Bronchitis	1.3	1.3	2.3	1.6	1.5	2.9	1.0	1.0	1.7
Pleurisy	0.5	0.5	0.5	0.5	0.5	0.8	0.4	0.4	0.2
Nose, throat and tonsils	1.2	1.2	0.9	1.2	1.2	1.2	1.2	1.3	0.7
Other respiratory diseases	0.3	0.2	0.4	0.3	0.3	0.6	0.2	0.2	0.1
<i>Diseases of Digestive System</i>	11.7	11.5	14.3	9.4	9.2	11.9	13.9	13.7	16.9
Indigestion	4.8	4.6	7.0	3.6	3.5	5.9	5.9	5.7	8.2
Stomach ulcers	2.7	2.8	1.8	3.8	3.8	2.2	1.6	1.6	1.3
Gall bladder	2.2	2.1	3.5	0.7	0.7	1.8	3.7	3.6	5.3
Liver	0.3	0.3	0.5	0.2	0.2	0.5	0.4	0.4	0.6
Intestines	0.7	0.7	1.0	0.5	0.4	1.0	1.0	1.0	1.1
Appendicitis (chronic and not specified)	0.8	0.8	0.4	0.5	0.5	0.5	1.0	1.1	0.2
Other abdominal diseases	0.2	0.2	0.1	0.1	0.1	—	0.3	0.3	0.2
<i>Rheumatism, Arthritis, Neuralgia, Neuritis</i>	20.2	16.9	70.5	16.5	13.2	64.1	24.0	20.5	77.2
Rheumatism	14.5	11.7	57.0	12.1	9.3	54.0	17.0	14.0	60.2
Arthritis	2.7	2.5	5.9	2.2	2.0	4.4	3.2	3.0	7.5
Lumbago (and other muscular pains)	0.6	0.6	1.3	0.9	0.8	1.7	0.4	0.4	0.8
Neuralgia, neuritis	2.4	2.1	6.3	1.3	1.1	4.0	3.4	3.1	8.7

¹ Persons with unknown employment status are omitted from this tabulation.

Appendix Table 1—Continued

NATURE OF DISABILITY	BOTH SEXES			MALES			FEMALES		
	Total 16 Years and Over	16-64 Years	65 Years and Over	Total 16 Years and Over	16-64 Years	65 Years and Over	Total 16 Years and Over	16-64 Years	65 Years and Over
<i>Heart, Circulatory and Blood Diseases</i>									
Heart diseases ²	33.2	30.3	76.2	23.7	20.7	68.3	42.7	40.0	84.6
High blood pressure, arteriosclerosis	18.4	16.8	42.2	14.8	13.1	41.1	22.1	20.7	43.5
Low blood pressure	7.5	6.5	23.2	4.2	3.2	17.8	10.9	9.7	28.9
Varicose veins and other diseases of the veins	0.6	0.5	0.9	0.4	0.4	1.1	0.7	0.7	0.7
Hemorrhoids	2.9	2.7	6.2	1.6	1.4	4.2	4.1	3.9	8.2
Anemia	1.0	1.0	1.4	1.5	1.4	2.3	0.6	0.6	0.4
Other circulatory and blood diseases	2.5	2.5	2.0	0.9	0.9	1.4	4.0	4.1	2.7
<i>Genito-Urinary Diseases</i>									
Kidney diseases ²	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2
Bladder diseases ²	10.4	10.0	16.3	5.9	5.0	19.0	14.9	15.0	13.4
Ill-defined genito-urinary diseases	5.3	4.9	11.7	4.9	4.2	14.9	5.9	5.7	8.4
Female diseases other than venereal	0.6	0.5	2.2	0.5	0.4	2.2	0.7	0.6	2.2
Complications of pregnancy and child birth	0.5	0.5	0.6	0.2	0.2	0.8	0.7	0.8	0.4
Male diseases other than venereal	3.6	3.8	.1	—	—	—	7.3	7.6	2.2
<i>Venereal Diseases</i>									
Syphilis and its effects	0.2	0.2	0.1	—	—	—	0.3	0.3	0.2
Gonorrhea and other venereal diseases	0.2	0.1	0.6	0.3	0.2	1.1	—	—	—
<i>Skin Diseases</i>									
Abcesses, ulcers, and boils	0.7	0.6	0.4	0.8	0.7	0.6	0.6	0.6	0.2
Other skin diseases	0.6	0.5	0.4	0.7	0.6	0.6	0.5	0.5	0.2
<i>Endocrine Disturbances</i>									
Goiter	1.0	0.9	2.2	0.9	0.9	1.9	1.1	1.0	2.6
Other glandular disturbances	0.4	0.4	1.2	0.4	0.4	0.8	0.4	0.3	1.6
<i>Chronic Poisoning and Intoxication</i>									
Alcoholism	0.6	0.5	1.0	0.5	0.5	1.1	0.7	0.7	1.0
Other poisoning due to organic substances	1.9	2.0	1.4	0.6	0.6	0.7	3.3	3.3	2.2
Poisoning due to mineral substances	1.6	1.7	1.2	0.4	0.4	0.3	3.0	3.0	2.2
Silicosis, miners' asthma	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.3	—
<i>Cancer and Other Tumors</i>									
Cancer	1.6	1.7	1.0	3.0	3.1	1.7	0.3	0.3	0.2
Brain tumor	1.0	1.1	0.6	1.9	1.9	0.8	0.2	0.2	0.2
Tumor	0.1	0.1	—	0.1	0.1	0.1	0.1	0.1	—
Growth (not stated as to malignancy)	0.1	0.1	—	0.1	0.1	0.1	0.1	0.1	—
<i>Miscellaneous and Ill-defined Diseases:</i>									
Diabetes	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Pellagra	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Malaria	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Mouth, teeth, and gums	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Senility	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Malnutrition	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Dwarf or midget	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Obesity	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Other infectious diseases	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—
Vaguely defined illnesses, not specifically stated	0.3	0.3	0.3	0.6	0.6	0.5	—	—	—

² Either specifically or vaguely defined.

Appendix Table 2. Number and proportion of persons 16 years of age and over reporting disabilities in the urban relief population, classified by type of disability reported and age.

NATURE OF DISABILITY	ALL AGES	16-64	16-24	25-34	35-44	45-54	55-64	65+
TOTAL, ALL PERSONS	449,464	421,509	112,046	96,965	95,697	74,665	42,136	27,955
TOTAL HANDICAPPED	94,944	75,787	8,470	11,781	18,727	19,905	16,904	19,157
RATE PER 1,000 PERSONS								
ALL DISABILITIES	211.2	179.8	75.6	121.5	195.7	266.6	401.2	685.3
Degenerative diseases	39.2	35.6	11.7	20.3	37.4	57.6	90.1	96.9
Orthopedic	36.9	33.8	14.7	23.8	37.2	50.5	70.8	84.2
Rheumatism	20.2	16.8	2.2	6.9	16.6	30.8	54.1	70.6
Eye and ear defects	19.7	17.6	8.5	11.6	18.6	26.3	38.0	51.1
Respiratory (including tuberculosis)	15.6	15.3	9.1	13.5	18.4	19.1	22.2	19.5
Mental and nervous	13.2	13.2	11.6	14.7	15.5	13.9	13.9	12.2
Hernia	11.2	9.9	2.7	5.1	10.9	16.9	25.7	30.0
Digestive diseases	11.6	11.4	4.3	9.2	14.6	16.3	19.8	14.3
Senility	20.8	3.7	—	—	—	2.3	32.5	279.2
All other diseases	22.8	22.5	10.8	19.5	27.3	31.3	34.1	27.3

Appendix Table 3. Prevalence of disabilities in the urban relief population 16-64 years of age and employed or seeking work, classified by usual occupation. (Rate = per cent of population reporting disabilities.)

OCCUPATION	POPULATION	ADJUSTED RATE ¹	CRUDE RATE
ALL OCCUPATIONS	255,041	13.8	14.2
<i>Professional and Semi-Professional Persons</i>	5,827	12.3	12.4
Professional Persons	5,385	11.8	11.8
Actors and showmen	514	17.3	16.1
Artists, sculptors and teachers of art	221	16.7	15.8
Designers, draftsmen and architects	493	13.8	13.0
Musicians and teachers of music	993	14.3	14.5
Physicians, dentists, veterinaries and osteopaths	63	7.6	15.9
Teachers (school and college)	1,200	8.5	7.8
Technical engineers and chemists	637	5.9	7.1
Trained nurses	466	11.1	10.5
Other professional persons ²	798	13.2	14.3
Semi-Professional Persons	442	17.9	19.2
Proprietors, managers and officials in recreational pursuits	131	17.2	19.1
Other semi-professional and recreational workers	311	18.0	19.3
<i>Proprietors, Managers and Officials</i>	8,397	18.1	22.8
Agricultural proprietors and managers	2,339	17.6	23.1
Builders and building contractors	838	14.9	19.6
Hotel and restaurant keepers and managers	514	13.4	18.9
Manufacturers, proprietors, managers and officials (n.e.c.) ³	1,453	16.0	20.8
Wholesale and retail dealers	3,253	20.4	24.9
<i>Clerical Persons</i>	28,599	14.0	11.6
Clerical	13,821	12.6	10.1
Bookkeepers, cashiers and accountants	2,663	11.6	11.0
Clerical workers (proper)	6,831	13.4	11.5
Quasi-clerical workers; express and railway clerks, etc.	247	18.0	17.0
Office boys, telegraph and other messengers	1,309	17.3	8.3
Stenographers and typists	2,771	8.8	5.8
<i>Sales People</i>	13,689	15.2	13.4
Advertising agents	117	15.5	19.7
Agents, collectors and credit men	454	16.0	18.1
Commercial travelers	767	18.6	22.0
Newsboys	516	21.3	12.4
Real estate and insurance agents	985	14.7	19.9
Salesmen and saleswomen (proper)	10,850	14.7	12.0
<i>Telephone, telegraph and radio operators</i>	1,089	10.1	8.5
Telephone operators	898	9.0	7.3
Telegraph and radio operators	191	13.7	14.1

¹ The crude rate has been adjusted to the age distribution of all gainful workers in the United States in 1930.

² Clergymen, authors, editors, reporters, lawyers, judges, etc.

³ Not elsewhere classified.

Appendix Table 3—Continued

	OCCUPATION	POPULATION	ADJUSTED RATE ¹	CRUDE RATE
4 65+				
6 27.955				
4 19,157				
685.3				
96.9				
84.2				
70.6				
51.1				
19.5				
12.2				
30.0				
14.3				
279.2				
27.3				
	Skilled Workers	46,319	13.2	15.5
	Blacksmiths, forgemen and hammermen	906	12.1	18.3
	Boilermakers	442	11.2	16.3
	Brick and stone masons and tile layers	2,676	7.7	9.5
	Cabinet makers	563	11.6	14.2
	Carpenters	7,369	10.6	15.0
	Electricians	1,662	13.2	12.1
	Engineers (stationary), cranemen, hoistmen, etc.	1,879	12.8	16.3
	Locomotive engineers and firemen	830	13.3	12.8
	Machinists, millwrights and tool makers	3,032	13.7	16.8
	Mechanics (not otherwise specified)	4,378	16.0	14.7
	Molders, founders and casters (metal)	1,202	12.5	16.2
	Painters, enamelers, varnishers (building) and paper hangers	6,393	15.8	17.8
	Painters, glaziers, enamelers and varnishers in factories	1,199	14.1	14.7
	Pattern and model makers	135	23.4	17.8
	Plasterers and cement finishers	2,594	9.0	11.1
	Plumbers and gas and steam fitters	2,310	10.0	12.7
	Rollers and roll hands (metal)	211	15.3	16.1
	Roofers and slaters	508	14.3	15.4
	Sawyers	648	20.2	22.1
	Shoemakers and cobblers (not in factory)	521	18.7	21.9
	Structural iron workers (building)	695	10.7	13.4
	Tailors and tailoresses	579	15.1	23.0
	Tinsmiths and coppersmiths	790	14.5	15.6
	Upholsterers	362	12.3	12.2
	Skilled workers in printing, publishing and engraving	881	16.4	15.7
	Foremen, overseers and inspectors ⁴	1,967	16.8	19.4
	Skilled workers (n.e.c.) ³	1,487	17.0	20.2
	Semi-Skilled Workers	70,814	14.9	14.2
	Operatives	46,148	15.0	14.3
	Operatives in building trades	452	12.1	13.3
	Operatives in cigar factories	1,883	13.2	12.3
	Operatives in clothing factories	5,962	10.3	14.6
	Other operatives	33,246	14.6	13.9
	Sailors, deck hands, boatmen and canalmen	361	13.2	13.9
	Switchmen, flagmen and yardmen	554	18.2	22.7
	Telegraph and telephone linemen	250	16.4	17.6
	Watchmen, guards and doorkeepers	500	30.7	35.0
	Other workers (semi-skilled)	2,940	15.9	14.5
	Other	24,666	14.8	14.0
	Bakers	1,088	16.5	15.6
	Barbers, hairdressers and manicurists	1,529	19.6	20.9
	Boarding and lodging housekeepers	385	17.6	29.4
	Boiler washers and engine hostlers	208	11.0	11.5
	Brakemen	570	14.1	18.4
	Chauffeurs, deliverymen, truck and tractor drivers	14,423	13.3	11.0
	Assistants and attendants to professional persons	141	16.5	13.5
	Other attendants and helpers	797	17.1	10.8
	Laborers (professional service, recreation and amusement)	177	13.2	12.4
	Dressmakers, seamstresses and milliners	2,071	16.0	19.3
	Filets, grinders, buffers and polishers (metal)	868	15.0	7.0
	Housekeepers, stewards and practical nurses	2,190	16.9	20.1
	Oilers of machinery	189	11.5	11.6
	Unskilled Workers	95,185	13.2	13.7
	Laborers	53,522	12.4	13.3
	Draymen, teamsters and expressmen	922	17.4	21.6
	Farm laborers	6,460	16.2	15.2
	Firemen (except locomotive and fire department)	1,487	17.0	19.4
	Fishermen and oystermen	608	18.0	16.9
	Furnacemen, smeltermen, heaters and puddlers	637	10.1	13.5
	Longshoremen and stevedores	1,342	10.0	15.5
	Lumbermen, raftsmen and woodchoppers	1,864	13.4	15.7
	Miners, oil, gas and salt well operatives	10,391	10.9	13.0
	Laborers (not elsewhere classified)	29,781	12.0	12.6
	Servants and Allied Workers	41,663	14.5	14.2
	Bootblacks	378	18.3	15.9
	Charwomen, cleaners and laundresses	5,904	14.4	17.3
	Elevator tenders	762	20.8	16.9
	Janitors and sextons	2,254	14.8	17.2
	Porters	1,367	15.2	15.4
	Servants	27,093	14.1	13.1
	Waiters, waitresses and bartenders	3,995	16.5	13.5

¹ The crude rate has been adjusted to the age distribution of all gainful workers in the United States in 1930.

³ Not elsewhere classified.

⁴ Except inspectors and foremen in lumber camps, factories, laundries, and cleaning establishments.

INCOME ¹	RELIEF		NONRELIEF	
	Population	Per Cent Reporting Disability	Population	Per Cent Reporting Disability
ALL CLASSES	6,987	21.3	32,553	8.0
Under \$5	5,395	24.0	4,404	21.2
\$5-9	299	15.1	574	11.7
10-14	392	13.3	1,931	9.9
15-19	378	11.6	3,907	8.2
20-24	217	7.8	4,495	6.7
25-34	213	10.8	7,453	5.3
35+	93	8.6	9,789	4.1

¹ It is probable that the earnings reported by many of the relief families in the higher income brackets were simply the weekly wage to be received at a new job, and that they did not represent sums actually in hand during the week in which relief was received. Relief agencies often carry a family until the first pay day after the wage earner has found a job.

Appendix Table 4. Prevalence of disability among the relief and nonrelief populations of Dayton, Ohio, classified according to weekly income of family. (July, 1934)

ment to duty incompatible with such disability as may be present." In keeping with this admonition, and to facilitate the heeding of it, some rather specific directions were given concerning the conditions to be especially looked for in the various sections of the examination. The methods of examination included observation of physical abnormalities, lesions, and growths, stethoscopic examination of heart and lungs, counting pulse rate, and measuring degree of vision. Mental abnormality was defined as obvious lack of mental balance; and deafness as inability to hear ordinary conversation in the course of the examination.

The physical examination was supplemented by a very meager case history.

The instructions to the physicians for classifying the more seriously disabled follow:

Assignment to Class C (light work which requires special placement) shall be based on findings such as the following: poor nutrition; old-age; serious defective vision or hearing; seizures of vertigo or epilepsy; diabetes, arteriosclerosis; compensated cardio-vascular

conditions which are not suitable for Class B; moderately high blood pressure (about 170); past history of tuberculosis; hernias which are not well supported; recent operations, injuries or illnesses; partial paralysis; deformities not suitable for Class B. Such men may be either assigned to work on the ground or to work not involving any continuous muscular exertion, such as clerical and other white-collar work; flagmen, timekeepers, etc.; skilled trades, to which the man is accustomed, not involving any considerable muscular exertion. Placement of every Class C man must be based on physician's report and recommendation.

Any individual should be assigned to Class D who is physically or mentally unadapted for any available work relief and who, if employed, would be a menace to himself, to his fellow workers, or to property.

TUBERCULOSIS ADMINISTRATION IN THE BELLEVUE-YORKVILLE HEALTH CENTER DISTRICT OF NEW YORK CITY¹

by JEAN DOWNES AND MARGARET WITTER BARNARD, M.D., Dr. P. H.

MORE detailed and critical study of the effectiveness of the various services which fall within the province of public health should be made in order to counteract the tendency for administrative procedures to become inflexible and merely routine. This particular paper presents an attempt to evaluate a cross-section of the work done by the Bellevue-Yorkville Health Center in the control of tuberculosis and may serve as an example of a method of study of administrative procedure in one department of public health.²

The Bellevue-Yorkville Health Center, which was established in 1926 as an experiment, was made possible through the organization of the official and voluntary health and welfare agencies and institutions which had been working in that area, and the financial assistance of the Milbank Memorial Fund during the period 1926-1934. It served a population of approximately 153,000 living in the section of the Borough of Manhattan bounded by the East River, 14th and 64th Streets and Fourth Avenue below and Sixth Avenue above 42nd Street. Fifty per cent of the 43,539 families living in the area were classed as foreign born with Italian and Irish predominating. Economic status of families in the district as expressed

¹ From the Milbank Memorial Fund.

Acknowledgments are made to the New York City Department of Health, especially to Dr. Shirley W. Wynne, former Commissioner of Health, for access to the records used in this study. Acknowledgments are made also to Mr. Savel Zimand, then administrative director of Bellevue-Yorkville Health Center; Dr. J. Burns Amberson, director of the Tuberculosis Service of Bellevue Hospital; and to Dr. H. R. Edwards, now director of the Division of Tuberculosis of the New York City Department of Health, who read the manuscript of this study and gave helpful suggestions and criticisms.

² In 1935 the tuberculosis clinic of the Department of Health in Bellevue-Yorkville was discontinued. The population of Yorkville is now served by Lenox Hill Hospital and New York Hospital out-patient departments and that of upper Bellevue by the out-patient department of Bellevue Hospital.

in terms of rentals showed that 39 per cent of the families paid less than \$30.00 per month for rent and 60 per cent less than \$50.00.

Bellevue-Yorkville district is one of the areas of Manhattan with a relatively high tuberculosis mortality. Figure 1 shows that for the period 1922-1931 the tuberculosis death rates for Bellevue-Yorkville were slightly higher than the rates for Manhattan except for the years 1929-1931 and considerably higher than the rates for all of New York City throughout the period.

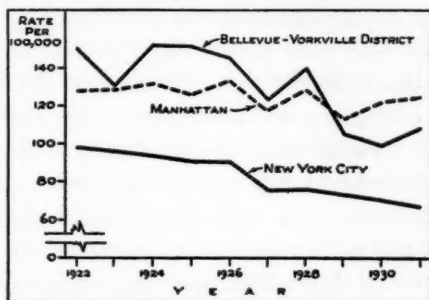


Fig. 1. Tuberculosis mortality for the Bellevue-Yorkville district, Manhattan, and New York City (based on residents only), 1922-1931. (Data from Health Conditions, Bellevue-Yorkville District, New York City, by Godias J. Drolet and Edith H. Clark.)

Consequently, the control of tuberculosis has been one of the major interests in the development of the health center program in this particular district and additional services were established to supplement those provided by the former Yorkville clinic and by the Bellevue Hospital clinic.

DATA AND METHOD OF STUDY

The method employed in this particular study is that of observing a cross-section of clinic cases and their families over a period of time. Data were secured for all cases of tuberculosis supervised by the Bellevue-Yorkville clinic, which were reported or diagnosed during the year 1931.³ The data consist of records for each patient of all examinations and supervision given at the clinic, records of the services rendered by the public health nurse to the case and the family, and records concerning the examination of family con-

³ By 1931 the program of tuberculosis control at Bellevue-Yorkville was well established, consequently the management and supervision of cases and families admitted at that time may be considered as typical of the work for a number of years.

tacts of each patient. All records of clinic supervision cover the period from the date of diagnosis (sometime during 1931) to September 1, 1933; those for the nursing service include the same period and an additional five months, that is, to February 1, 1934. Records were secured also for a sample (311 cases) drawn at random from the alphabetical file of the total clinic cases examined during 1931 and found to be negative for tuberculosis.

It should be emphasized that a study of the effectiveness of administrative procedure in the control of tuberculosis in any area includes much more than a study of clinic management. Such a study should deal with administration in its broader aspects and should throw light upon the degree to which the problem in the particular area is being modified through successful case-finding, and adequate supervision of cases and their contacts, both in the clinic and in the home. It involves both qualitative and quantitative evaluation of the work of the clinic physician and the public health nurse. The discussion of the tuberculosis work of the Bellevue-Yorkville Health Center will be clarified by a brief description of how the general administration of tuberculosis in the Borough of Manhattan operated.

ADMINISTRATION OF TUBERCULOSIS IN NEW YORK CITY

The tuberculosis clinics of the Department of Health of the City of New York under the Division of Tuberculosis were set up in various districts not served by hospital dispensaries chiefly to provide diagnostic and supervisory centers for the cases of tuberculosis not able to pay for the care of a private physician. They were used also as diagnostic centers for the examination of contacts and for general case-finding. The physicians who were employed for the work in the clinics usually served three clinic sessions, or a total of six hours a week. The public health nursing service in the various districts was directed from the central office of the Bureau of Nursing through the assistance of the superintendents

of the various services and the local supervisors in each district.

Individuals who have pulmonary tuberculosis were reported to the Borough office by private physicians, institutions, and other agencies within twenty-four hours after the diagnosis had been made.⁴ The Borough office sent daily to the district office a list of all newly reported cases. These reports did not pass through the hands of the physician in charge of the district clinic but were sent to the district office of the Bureau of Public Health Nursing. A current register of the tuberculosis cases in the district classified according to the medical supervision which they were receiving was kept by the public health nurses and visits were made to reported cases according to a routine set up by the Division of Tuberculosis in cooperation with the Bureau of Nursing of the New York City Department of Health.⁵

⁴ Section 86 of the Sanitary Code of the Board of Health of the City of New York states that it should be the duty of every hospital, institution, dispensary, or physician to report the full name, age, and address of every patient under their care within twenty-four hours after the time the patient has been diagnosed as ill with pulmonary tuberculosis.

⁵ Patients who have been diagnosed as having pulmonary tuberculosis are classified into seven groups, according to the medical supervision which they are receiving.

1. *Department of Health Clinics:* Includes patients under the care of a Health Department tuberculosis clinic. Visits are made every month to patients having positive sputum and every two months to those having negative sputum.

2. *Non-Department of Health Clinics:* Includes patients under the care of a non-Department of Health tuberculosis clinic which is a member of the Association of Tuberculosis Clinics. One visit only is made for the purpose of locating the patient and making out Health Department records.

3. *Hospital:* Includes patients who are being cared for in city-administered hospitals or hospitals subsidized by the City. Routine visits are made to the homes of these patients every three to six months, according to the information obtained.

4. *Sanatorium and Out of Town:* Includes patients whose known temporary residence is outside New York City. The patients may or may not be in hospitals or sanatoria. Visits are made to the New York City address every three to six months, depending on the information obtained.

5. *Private Physicians:* Includes all those patients who have been reported as having pulmonary tuberculosis by private physicians and who are reported every two months by private physicians to be continuing under their care. Visits are made only when the physician requests the nurse to visit. Forms are sent to each private physician when he reports a tuberculous patient, explaining the nurses' services and giving him an opportunity to request the service. Patients who are employees of the New York Telephone Company or the Metropolitan Life Insurance Company, or the Medical Service Club, or who are under the care of the Committee for the Care of the Jewish Tuberculous are listed as private physician's cases.

6. *At Home:* Includes patients who have been diagnosed by a physician as having pulmonary tuberculosis but who have ceased to be under any medical supervision. Positive sputum cases in this group are visited once a month or oftener if necessary and negative sputum cases every two months. Every effort is made to get the patient again under care if he is ill. When the patient is found to be apparently well, every effort is made to persuade him to report to a physician or to a clinic for reexamination and possible discharge.

7. *Not Found:* Includes reported cases which cannot be located. These cases are visited once every month for three months if necessary in the effort to locate the patient. If unsuccessful, inquiries are made at the Post Office for correct addresses. If the patients still cannot be located, their records are removed from the active file.

From the description above it can be seen that the direction or supervision of administrative work of tuberculosis control was highly centralized in the Borough office. The responsibility for carrying out procedures for the control of tuberculosis in the district was placed primarily on the public health nurse and the physician in charge of the clinic was not informed as to the extent of the problem among the population in the district. This was due no doubt to the fact that in most districts in the City the diagnostic and medical work in tuberculosis was carried by physicians working only part-time.

THE TUBERCULOSIS PROBLEM IN THE DISTRICT

Among the residents of Bellevue-Yorkville district, 570 new cases of pulmonary tuberculosis were reported during 1931. Less than 5 per cent of these cases were discovered by means of the district clinic and only about 10 per cent had any contact with the clinic, either supervisory or diagnostic.

Data are not available to show how the total 570 new cases were discovered. An analysis of the 151 cases, however, who were residents of Bellevue-Yorkville district and who died during 1932, revealed that 106, or 70 per cent, were first diagnosed and reported from a hospital where they were ill with tuberculosis.⁶ (These data are exclusive of individuals who gave the municipal lodging house as the place of residence.) In other words, the majority of these cases were not discovered until they were too ill for medical care or supervision to be of much benefit. This points unmistakably to a serious need for improved case-finding activities.

During the year 1931, 193 new cases of tuberculosis were admitted to the chest clinics.⁷ Twenty-three of these cases came to the pneumothorax refill clinic and 22 of them came from outside

⁶ Unpublished data furnished by Mr. Savel Zimand, administrative director of the Bellevue-Yorkville Health Center.

⁷ A consultation service for the use of practicing physicians who wish to send patients unable to afford a private consultation service was maintained but its service was not included in this analysis.

Bellevue-Yorkville district.⁸ Slightly more than half of the remaining 170 cases came from districts other than Bellevue-Yorkville. If cases of adult pulmonary tuberculosis alone be considered, approximately two-thirds of the total 152 cases were residents of other sections of New York City. Of the 58 new cases of pulmonary tuberculosis who were residents of the district, 26 were discovered through the medium of the clinic and 32 were diagnosed elsewhere and referred for supervision.

In view of the evidence of unmet problems in the district, and of the fact that 18 per cent of the total 570 new cases reported among residents in the Bellevue-Yorkville district were under neither medical nor clinic supervision, the policy of carrying cases from various sections of New York for supervision might be questioned.⁹ Furthermore, tuberculosis is a family problem as well as a community problem, and for the most effective supervision and treatment of the case the family situation must be considered. For cases from outside the district, no record of the family situation relative to economic status, living conditions, examination of family contacts, etc., was available at the Bellevue-Yorkville clinic.¹⁰

CASE FINDING

Amberson has said "... the measure of practical effectiveness of any case-finding scheme can be expressed in terms of the percentage of early cases discovered."¹¹ He points out also that, "in 1932 in New York City, among 3,686 new active cases admitted to and diagnosed in the tuberculosis clinics, 71 per cent were found

⁸ The pneumothorax clinic was set up by the Department of Health as an evening clinic and, being the only one of that sort, was intended to serve a need for the entire City.

⁹ X-ray and fluoroscopic examination facilities were made a part of the tuberculosis clinic equipment. Such facilities were not available generally in the district clinics of the City and this fact may have been instrumental in determining the policy of supervising cases from other sections of New York.

¹⁰ At the beginning of 1933 a change in policy was made restricting clinic cases to Yorkville district only. This change was made necessary because of reduced personnel.

¹¹ Amberson, J. Burns: Some Case Finding Principles of Practical Significance, *Journal of the Outdoor Life*, September, 1934, xxxi, No. 9.

CLASSIFICATION AS TO SOURCE	TOTAL CASES	TYPE OF TUBERCULOSIS		
		Adult Pulmonary	Childhood Type	Other Forms
Reported cases Cases diagnosed in clinic	PER CENT			
	100.0	91.4	8.6	0
	100.0	54.2	45.8	0
	NUMBER			
Reported cases	35	32	3	0
Cases diagnosed in clinic	48	26	22	0

Table 1. Reported cases and cases diagnosed in clinic classified according to type of tuberculosis, Bellevue-Yorkville Clinic—1931.

on their first visit to have second or third stage disease." If this classification be applied to the total 130 cases of pulmonary tuberculosis admitted to Yorkville clinic during 1931, for 62 per cent the disease was moderately advanced or advanced compared with 71 per cent for New York City. If only cases from Bellevue-Yorkville district be considered, 55 per cent of the cases admitted to clinic were classed as moderately advanced or advanced.

Table 1 shows for Bellevue-Yorkville district the reported cases and those diagnosed in clinic classified according to type of tuberculosis. It is clearly evident that the clinic has been instrumental in discovering and placing under supervision cases of childhood type tuberculosis. These cases are not discovered without X-ray and are not reported.

Table 2. Source of referral for 955 clinic cases.

Referring Agency	Number	Per Cent
TOTAL CASES	955	100.0
Referred by:		
Nurse	465	48.7
Private physician	67	7.0
Social agency	130	13.6
Self ¹	225	23.6
Others	68	7.1

¹ Individuals who came of their own accord.

During 1931 there were 1,048 persons examined for the first time in the Bellevue-Yorkville chest clinic. These individuals were referred for various reasons by public health nurses, social agencies, and

REASON FOR REFERRAL	REFERRING AGENCY			
	Nurse	Private Physician	Social Agency	"Self"
	PER CENT			
TOTAL	100.1	100.0	100.1	100.1
Contact	37.9	35.0	30.8	11.8
Symptoms	18.6	30.0	43.6	45.6
Other illness	15.7	25.0	15.4	30.9
No reason given	27.9	10.0	10.3	11.8
	NUMBER			
TOTAL	465	67	130	225
Contact	176	23	40	26
Symptoms	86	20	57	103
Other illness	73	17	20	70
No reason given	130	7	13	26

Table 3. Clinic cases referred by nurse, private physician, social agency, and "self" classified according to the reason for referral.

private physicians. Ninety-three were registered cases of tuberculosis previously diagnosed and were referred to the clinic through official channels. Table 2 shows the distribution of the remaining 955 cases according to the referring agency. Approximately half, or 49 per cent, was referred by the nurses, 24 per cent came of their own accord, 14 per cent was sent by a social agency, and 7 per cent by private physicians.¹²

Table 3 shows the clinic cases referred by nurse, private physician, social agency, and "self" classified according to the reason for referral. As would be expected, the largest number (38 per cent) of the 465 persons referred by nurses was asked to come to clinic because of contact with tuberculosis. Nineteen per cent was referred because of symptoms of tuberculosis, 16 per cent because of "other illness," and for 28 per cent of the total cases no reason for coming to clinic was given. The persons referred by

¹² The private physicians rarely referred patients to the particular clinic under discussion because there was a special consultation clinic maintained especially for their use at Bellevue-Yorkville.

REFERRING AGENCY	TOTAL	CONTACT	SYMPTOMS	"OTHER ILLNESS"	NO REASON STATED
DIAGNOSED CASES PER 100 PERSONS EXAMINED					
TOTAL	9.2	12.1	16.9	0.6	2.3
Nurse	9.0	13.6	17.4	0	0
Private physician	16.4	17.4	35.0	0	7.7
Social agency	11.5	7.5	17.5	5.0	0
Self	6.2	3.8	12.6	0	2.3
NUMBER EXAMINED					
TOTAL	887	265	266	177	176
Nurse	465	176	86	72	129
Private physician	67	23	20	16	7
Social agency	130	40	57	20	13
Self	125	26	103	69	27

Table 4. Tuberculosis case rate among clinic cases examined because of contact, symptoms of tuberculosis, or "other illness."

private physicians were fairly evenly distributed as to reason for the clinic examination; from 35 to 25 per cent was examined because of contact or illness suggestive of tuberculosis or "other illness." Forty-four per cent of those sent by a social welfare agency came because of symptoms of tuberculosis, 31 per cent because of contact, and only 15 per cent because of "other illness." Approximately half of the 225 persons who came of their own accord for a clinic examination came because of illness suggestive of tuberculosis, 31 per cent because of "other illness" and only 12 per cent came to clinic because of contact with tuberculosis.¹³

It is important to know among what groups the new cases of tuberculosis were found. Table 4 shows the rate of diagnosed cases among persons examined (1) because of contact, (2) because of symptoms of tuberculosis, (3) "other illness," and (4) those for whom no reason was stated. The highest rate of tuberculosis,

¹³ Under "symptoms of tuberculosis" have been classed the following complaints: fatigue or worn-out feeling, loss of weight, cough with or without sputum, dyspnea, hemorrhage, fever, night sweats, and cold of unusual duration (two weeks or longer). The following complaints have been classed as "other illness": pain in back, side, or abdomen; grippe; acute cold; indigestion; and dizziness.

namely, 16.9 per cent, was found among those referred because of symptoms. A slightly lower rate (12 per cent) was recorded for contacts. By contrast, a relatively low rate of tuberculosis (0.6 and 2.3 per cent) was found among individuals who came to clinic because of "other illness" or for whom no reason was stated. The cases of tuberculosis found among these latter groups were classed as "healed" tuberculosis on diagnosis and were carried less than two months for supervision by the clinic. The important cases of tuberculosis were found among 60 per cent of the total persons examined. It is plainly evident that there are two groups of individuals with whom the tuberculosis clinic should be mainly concerned, contacts to known cases and persons with symptoms suggestive of tuberculosis.

EXAMINATION AND SUPERVISION OF CONTACTS TO TUBERCULOSIS CASES

One of the most important procedures for the control of tuberculosis is the examination and supervision of the contacts of infectious cases. Family contacts are examined and supervised in order to ascertain the amount of tuberculosis among the family members and through sanitary and hygienic teaching to prevent further spread of the disease. Securing the examination of family contacts and the teaching of health measures, especially in the home, is considered the responsibility of the public health nurse. However, the clinic physician has an unusual opportunity which had not been fully utilized for facilitating the work of the nurse through education of the patient in the clinic as to health measures and the importance of the examination of the family contacts.

Since the Bellevue-Yorkville clinic had no records of the examination of contacts of cases who came from other districts in New York, the discussion dealing with the examination of family contacts necessarily must be confined to cases within the district. Table 5 shows that 54.5 per cent of the contacts in 43 families in

which there was a case of adult pulmonary tuberculosis was examined. When the contacts are classified by age, 70.6 per cent of those less than 20 years of age was examined compared with 37.5 per cent of those 20 years of age or older. Attention should be called to the fact that for these families we have a minimum period of observation of eighteen months and a

Table 5. Per cent of contacts examined in 43 families in which there was a case of adult pulmonary tuberculosis.

Age Groups	Total Contacts	Number Examined	Per Cent Examined
ALL AGES	132	72	54.5
0-19	68	48	70.6
20+	64	24	37.5

maximum of thirty months from the time the primary case was reported or diagnosed. With this fact in mind, the examination rate for adult contacts seems low.

The examination of contacts in 18 families where the primary case was childhood tuberculosis is shown in Table 6. Only 32 per cent of the total contacts was examined; 41 per cent of the 44 persons under 20, and 23 per cent of those over 20 years of age. Since the chief purpose of the examination of contacts in these families is to find the source of infection, emphasis should be placed upon the examination of the adult members of the families where infectious cases of tuberculosis are more apt to occur.¹⁴

Table 6. Per cent of contacts examined in 18 families in which the primary case was childhood type.

Age Groups	Total Contacts	Number Examined	Per Cent Examined
ALL AGES	84	27	32.1
0-19	44	18	40.9
20+	40	9	22.5

Seven cases of childhood type and one case of minimal adult pulmonary tuberculosis were diagnosed among the 72 contacts examined in the 43 families with a case of adult pulmonary tuberculosis, or a rate of 11 per 100

¹⁴ Families in which the primary case is one of childhood type tuberculosis do not come under the usual routine of the public health nurse in New York City. However, the examination of contacts in these families was set up as a part of the routine for Bellevue-Yorkville district, since there, much emphasis was being placed upon childhood tuberculosis as an important part of tuberculosis control.

AGE GROUPS	TOTAL	RECOMMENDATIONS						
		Revisit	Disch.	No Recom.	Med. Cl.	Cardiac Cl.	Trans. to Other Dist. Cl.	Nose & Throat Cl.
ALL AGES	94	27	50	12	1	1	2	1
0-4	6	1	2	1	1	0	1	0
5-14	11	5	4	2	0	0	0	0
15-19	20	5	9	5	0	0	1	0
20+	57	16	35	4	0	1	0	1

Table 7. Recommendations of the physician for 94 contacts who were found negative on clinic examination, 1931.

persons examined. One case of childhood type tuberculosis was diagnosed among the 27 contacts examined in the 18 families, or a rate of 4 per 100 persons examined.

As a matter of routine all contacts are supposed to be examined every six months and are notified by postcard to that effect rather than solely by means of a nursing visit. However, a sample of 94 contacts, selected at random from the files, had an average of one examination during a period of observation of from eighteen to thirty months. On the other hand, the contacts in a group of tuberculous families studied made from three to four visits to clinic a year. (This group was weighted by child contacts and the former group by adult contacts.)

The physicians' recommendations for the 94 contacts classified by age are shown in Table 7. A return visit to clinic was recommended for 27 contacts, 50 were discharged, for 12 there was no recommendation, attendance at special medical clinics was recommended for 3, and 2 were transferred to clinics in other districts. For all of these contacts exposure to tuberculosis was continuing or had been recent. There was no evidence from the clinic records that the physician, in making recommendations for the clinic supervision of contacts, took into account more than the medical findings of the individual patient at the time of examina-

tion. Other facts which might well be used as an aid by the physician in determining the necessity for close and continued supervision are: the probable duration of exposure to the infectious case in the family; the factor of continuing exposure; the intimacy of contact, and the age of the individual under consideration. None of these facts, except age, can be obtained from the individual clinic record and the records for other members of the family were not assembled. Consequently, the physician was dealing only with the individual patient and not with the tuberculous family as a group. It is obvious that not all contacts need to be examined every six months and that some contacts, especially infants and children of preschool age, may need more frequent examinations for a period of time. Such a routine measure applying to all contacts undoubtedly produces much wasted effort rather than efficiency.

SUPERVISION OF TUBERCULOSIS CASES AND THEIR FAMILIES

Ordinary routine records are not sufficient for a complete evaluation of the educational work of the clinic physician and the public health nurse. However, the amount of supervision as indicated by the frequency of clinic examination of cases and of home visits of the nurses can be appraised from available records. Also, the examination of family contacts may be used as an objective measurement of the success with which the supervision, both by the doctor and the nurse, is carried out. Forty-seven cases of adult pulmonary tuberculosis reported or diagnosed during 1931 were carried for supervision both by the clinic and the public health nurses. Twenty-four of the 47 cases were carried for clinic supervision less than three months for the following reasons: hospitalization or sanatorium care was recommended for 11 cases; six were discharged as healed tuberculosis needing no further care; two cases were transferred, one to the care of a practicing physician and the other to another district; one case was dis-

CLASSIFICATION AS TO LENGTH OF TIME OF SUPERVISION	TOTAL CASES OR FAMILIES	NUMBER OF VISITS PER YEAR					
		2 or 3 Visits	4 or 5 Visits	6 or 7 Visits	8 or 9 Visits	10, 11 or 12 Visits	More than 12 Visits
CLINIC SUPERVISION OF CASES							
TOTAL	23	6	8	8	0	1	0
Cases under supervision more than 3 mos. but less than 1 year	3	1	2	0	0	0	0
Cases under supervision from 1 to 2 years	20	5	6	8	0	1	0
NURSING SUPERVISION OF FAMILIES							
TOTAL	23	1	0	7	0	7	8
Families under super- vision more than 3 mos. but less than 1 year	2	1	0	0	0	0	1
Families under super- vision from 1 to 2 years	11	0	0	5	0	2	4
Families under super- vision more than 2 years	10	0	0	2	0	5	3

Table 8. Annual number of clinic examinations for 23 tuberculosis cases and home visits by public health nurses to their families.

charged for nonattendance; and for four cases there was no record of any recommendation made by the clinic physician.

Table 8 shows the visits to clinic and the nursing visits in the home for the 23 cases who had more than three months' supervision. Even though 23 cases or families seem a small number from which to judge administrative procedure, the length of the period of observation for the majority of the cases (from one to three years) is sufficient to give some weight to the results. Twenty of the cases were under clinic supervision from one to two years. Six of these cases had four or five clinic examinations a year, and 8 cases were examined six or seven times per year. The nursing visits for the families of the 22 cases are shown in

the same table. Only 2 of the 23 families were visited by the public health nurse over a period of less than one year. Seven of the 21 families under observation more than one year were visited by the public health nurse six or seven times a year, 7 were visited ten to twelve times a year, and another 7 families were visited more than twelve times a year. (These are visits to the home and not visits to individuals.) Such intensive supervision of tuberculosis cases by both the clinic and the public health nurse may be questioned. Only 4 of the 23 cases had a positive sputum and it should be emphasized that the cases undoubtedly needing close supervision, those for whom hospital or sanatorium care was recommended, have been excluded from the table.¹⁵

CONCLUSIONS

The following conclusions may be drawn from the data presented in this paper: Knowledge of the tuberculosis problem within the population being served by a clinic such as Bellevue-Yorkville is of fundamental importance in conducting and planning a program for the control of the disease.

There is an evident need for some more effective method of case-finding in the population of the district. Greater efficiency may be obtained by limiting clinic cases to a more highly selected group, namely, contacts to known cases and persons with symptoms suggestive of tuberculosis.

Examination of a higher proportion of the family contacts, especially adults, is desirable. The clinic physician has an unusual opportunity to assist in securing the examination of these contacts through the education of the patient in the clinic as to the nature of tuberculosis and the importance of the examination of the family contacts.

A routine standard for the frequency of examination of family contacts is unsatisfactory. The recommendations for clinic super-

¹⁵ None of the cases included in Table 8 had had or was having pneumothorax therapy.

vision of contacts should be based upon knowledge of exposure to infection in the family as well as the medical findings and age of the individual patient at the time of examination.

It is apparent that a few families were given intensive service both by the clinic and the public health nurse. The question may be raised as to the wisdom of affording such intensive service to a few families when 18 per cent of the new cases reported during 1931 were under neither medical nor clinical supervision.

THIRD PROGRESS REPORT ON A STUDY OF FAMILY LIMITATION¹

by RAYMOND PEARL

I

THERE have been published² two reports on the progress of a comprehensive investigation of human fertility and the factors that influence it, with particular reference to the practice of contraception. These earlier progress reports have dealt only with samples from the material, including respectively 2,000 and 4,945 women.

The purpose of the present paper is to report the general progress of the investigation towards final completion, up to the present date, and to set forth in tabular form and briefly discuss some fragments of the final results. Since the plan and method of the investigation have been fully described in the earlier reports cited it will not be necessary to repeat them here.

II

Since the 1934 progress report was published we have *completed* (a) the *coding* of the information on all of the 30,949³ reproductive life histories comprising the total material. This coding was done by the writer personally for each case history and all items of information, except for a few routine items for which the code numbers

¹ From the Department of Biology of the School of Hygiene and Public Health, The Johns Hopkins University. Presented at the Annual Meeting of the Milbank Memorial Fund, March 26-27, 1936.

² Pearl, R.: Preliminary Notes on a Cooperative Investigation of Family Limitation. *Milbank Memorial Fund Quarterly Bulletin*, January, 1933, xi, No. 1, pp. 37-60. Second Progress Report on a Study of Family Limitation. *Ibid.*, July, 1934, xii, No. 3, pp. 248-269.

The two reports cited were condensed abstracts of longer papers as follows: Pearl, R.: Contraception and Fertility in 2,000 Women. *Human Biology*, September, 1932, iv, No. 3, pp. 363-407; Contraception and Fertility in 4,945 Married Women. A second report on a study of family limitation. *Ibid.*, May, 1934, vi, No. 4, pp. 354-401.

The author wishes to acknowledge with deep gratitude the continued financial support the Milbank Memorial Fund has given to this work.

³ Instead of 30,951 stated to be the total number in an earlier report. One case history turned out to have been included in duplicate. The other extra "case" was the result of an error in serial numbering, and did not exist in fact.

were put on the cards by Mrs. Augusta Hibbitts, but were subsequently checked by the writer personally. This coding was a tedious task. (b) The *computation* of the ages of the women and their consorts, and the age specific pregnancy and live birth rates, so that these data might be punched on the Hollerith cards; (c) the *punching* of two complete duplicate sets of just under 31,000 cards each, and the verification of the punching.

The *tabulation* of the complete material has been finished for a considerable number of items of information on the cards, and is steadily progressing at the present time relative to the remaining items.

The literature regarding fertility and the biology of human reproduction generally is extensive. Its digestion and assimilation is a formidable item in the program of the whole investigation. Steady progress is, however, being made. Already well over a thousand books, reports, and memoirs in medical, biological, sociological, and statistical journals pertinent to the enquiry have been read and abstracted in detail. The efficient help of Miss Hermine Grimm, assistant in biology, in this bibliographic phase of the work is gratefully acknowledged.

It is expected that the complete and definitive account of the results of the whole investigation will be published as a book, to be entitled HUMAN FERTILITY AND THE FACTORS THAT INFLUENCE IT. The present program calls for the completion of the manuscript by the end of the calendar year 1936. A substantial start on the writing has already been made. While experience has demonstrated the danger of prophecy relative to so extensive an undertaking as this, we are hopeful that the job will be finished within the scheduled time.

III

The first object of the present report is to present some data that will enable the formation of judgments regarding the adequacy, relevancy, and representative character of the sample of

women whose reproductive life histories make up the material.

Table 1 shows the geographical distribution of the cases, by states, cities, and race (white or Negro). The material involves 30,949 women resident in or near twenty-six large cities in fifteen states, east of (or on) the Mississippi River, and north of the southernmost tier of states (Alabama, Mississippi, etc.). Eleven cities in four states (New York, Illinois, Ohio, and Missouri) furnished 16,900, or 54.6 per cent, of the cases. The others are scattered as indicated in the table.

Negroes are somewhat more frequently represented in the sam-

Table 1. Geographical distribution.

STATES AND CITIES	NUMBER OF COOPERATING HOSPITALS	TOTAL WHITE CASES	TOTAL NEGRO CASES	GRAND TOTAL ALL CASES
TOTAL	139	25,316	5,633	30,949
New York (New York City, Rochester, Buffalo, Syracuse)	31	4,729	838	5,567
Illinois (Chicago)	20	4,155	193	4,348
Ohio (Columbus, Cleveland, Cincinnati, Toledo, Akron)	16	3,212	861	4,073
Missouri (St. Louis)	7	2,017	895	2,912
Minnesota (Minneapolis, St. Paul)	12	2,729	44	2,773
Michigan (Detroit, Ann Arbor)	10	2,161	393	2,554
Pennsylvania (Philadelphia and suburbs, Pittsburgh)	16	1,901	619	2,520
Maryland (Baltimore)	9	1,654	684	2,338
Tennessee (Nashville, Memphis)	6	567	738	1,305
Indiana (Indianapolis)	3	738	46	784
Kentucky (Louisville)	3	429	305	734
Wisconsin (Milwaukee)	3	643	1	644
Massachusetts (Boston)	1	248	9	257
District of Columbia (Washington)	1	120	—	120
New Jersey (Jersey City)	1	13	7	20

	White	Negro
Percentage of women in present sample	81.8	18.2
Percentage of living births in the fifteen states in 1931 and 1932	94.5	5.3
Percentage of living births in Birth Registration Area, in 1931 and 1932	87.3	11.3

PERCENTAGE OF ILLEGITIMATE BIRTHS TO ALL BIRTHS IN	WHITES	NEGROES (OR COLORED)
Present material	2.6	13.8
States from which present sample was drawn (excluding Massachusetts) in 1931 and 1932	2.0	12.9
U. S. Birth Registration Area, 1931 and 1932	2.0	15.3

Table 2. Illegitimacy.

ple than in the general population of the states from which it was drawn, or than in the United States as a whole. This, however, is rather an advantage than otherwise, because even 5,633 Negro cases are not enough, as will presently appear, to furnish adequate data when we come to finer categorical divisions relative to contraception, etc.

The fifteen states from which the present data are drawn include in their population (in 1930) 61.7 per cent of all white women in the United States 15 years of age and over, and 30.4 per cent of all Negro women in the country in the same age category. It is therefore probable that if the present sample fairly represents the population from which it was drawn it will also be fairly representative of the population of the United States as a whole, particularly so far as concerns white women.

Table 2 shows that the present sample agrees rather closely with the general population of the states from which it was drawn (excluding Massachusetts which keeps no records of illegitimacy), and with the general population of the United States as a whole, in respect of percentage of *illegitimacy*. On purely *a priori* grounds it might have been thought that the percentage of illegitimacy shown in a sample of urban-dwelling women resorting to hospitals to have their babies would be considerably higher than in the general population, but the data plainly give no significant support to such a view. In short the present sample appears to be fairly representative of the general population in this respect.

Similarly it is evident from Table 3 that in respect of *nativity* of

PERCENTAGES IN	NATIVE BORN	FOREIGN BORN
Present material	86.4	13.6
States from which present sample was born Mothers of living births, 1931 and 1932	85.1	14.8
U. S. Birth Registration Area Mothers of living births, 1931 and 1932	88.6	11.3

Table 3. Nativity of white women.

white women, the present sample is very fairly representative of the general population not only of the states from which it was drawn, but also of the United States as a whole.

Table 4 deals with the *religion* of the women in the present sample. In Part A of the table the material is thrown into five broad religious groups. In this classification "Christians" includes the women who expressed no denominational affiliation or preference, but wished it to be understood that they were neither Jews nor atheists.

The groups at the head of Part A of Table 4 have the following meanings:

INWED includes those women who experienced all their pregnancies while they were living in the state of wedlock.

OUTWED includes those women who experienced all their pregnancies while living outside the state of wedlock. This class includes two subclasses. Of these the first (ILLEG) includes those women who had never married up to the time of record. The second (PRENUP) includes those women who had conceived outside of wedlock, but who had subsequently married before the time of record and before the delivery of the products of their conceptions (prenuptial conception).

PARTLY includes those women some of whose conceptions and pregnancies had occurred while they were living in a state of wedlock, while others occurred while they were living outside the state of wedlock.

These four classes together include all the women in the sample.

Part A

RE- LIGION	WHITES							NEGROES							TOTAL	
	Inwed	Outwed			Partly	Total White	Per Cent White	Inwed	Outwed			Partly	Total Negro	Per Cent Negro		Both Races
		Illeg.	Prenup.	Total					Illeg.	Prenup.	Total					
TOTAL	22,965	667	836	1,503	848	25,316	100.0	3,571	777	458	1,235	827	5,633	100.05	30,949	
Protest- ants	10,703	379	436	815	442	11,960	47.2	3,291	706	420	1,116	779	5,196	92.2	17,156	
Catholics	8,842	245	368	613	360	9,815	38.8	233	49	28	77	33	343	6.1	10,158	
Jews	2,805	18	15	33	27	2,865	11.3	1 ¹	—	—	—	—	1	.05	2,866	
Christi- ans	402	12	11	23	10	435	1.7	15	2	2	4	3	22	.4	457	
No re- ligion	213	13	6	19	9	241	1.0	31	20	8	28	12	71	1.3	312	

Part B

DENOMINATIONAL GROUPS	PERCENTAGE OF WOMEN (BOTH RACES) IN PRESENT MATERIAL	PERCENTAGE OF MEMBERS OF DENOMINATION IN THE UNITED STATES IN 1926
SIX DENOMINATIONS TOGETHER	79.2	79.5
Catholic	32.8	34.1
Baptist	14.7	14.7
Methodist	11.4	13.9
Jewish	9.3	7.5
Lutheran	7.9	5.0
Presbyterian	3.1	4.3

¹ West Indian mulatto, whose white ancestry was Jewish, and in that faith she worships.

Table 4. Religion.

Confining attention for the moment primarily to Part A of Table 4 it is seen that while among the whites just under a half are Protestants, the Catholics are a rather close second in total representation. Actually, as Part B shows, there were more than twice as many Catholic women proportionately in the sample as there were of any other *single* denomination. The Protestants overtop the Catholics in the total because of the cumulative effect of their numerous separate denominations or sects. Among the Negroes, the Protestants overwhelmingly predominate.

A point of particular interest in Part A of Table 4 is the ex-

tremely low proportion of Jews, as compared with other religious categories, found in the OUTWED and PARTLY classes. The figures speak well for the extent to which the standards of sexual morality in the Jewish code are lived up to, even in present day urban populations.

Turning attention now to Part B of Table 4 it is evident that the present sample is very fairly representative of the general population of the United States as a whole in respect of affiliation with the six principal separate denominations, which together include just under 80 per cent of all persons having any religious affiliations at all. The greatest departure of the present sample from the general population is for the Lutherans, probably connected with the fact that we are dealing only with residents of large urban centers. But, taken as a whole, Part B of Table 4 shows clearly that there is no reason to mistrust the present sample on grounds of religious distribution.

Table 5 deals with the formal *education* of the women in the sample. Part A shows that about 40 per cent of the white women, and about 30 per cent of the Negro women, received high school or higher educational training. Unfortunately no statistics are known to the writer that would make it possible to determine whether these proportions are fairly representative of conditions in the general population or not. It appears probable from general considerations that the sample is not widely divergent in this respect, but there seems no way available to test the point adequately for the whole educational range.

In respect of one educational category (the illiterate), however, there are general population statistics for comparison. This comparison is made in Part C of Table 5. The first two lines of that tabulation indicate that, insofar as illiteracy may be used as a criterion, the present sample is fairly close to the general population of the states from which it was drawn. On the basis of this criterion the present sample, insofar as it diverges at all, is better (that is,

Part A

HIGHEST DEGREE OF FORMAL EDUCATION	TOTAL WHITE	PER CENT WHITE	TOTAL NEGRO	PER CENT NEGRO	GRAND TOTAL
TOTAL	25,316	100.0	5,633	100.0	30,949
Illiterate	526	2.1	294	5.2	820
Elementary schools	14,605	57.7	3,657	64.9	18,262
High school	8,513	33.6	1,575	28.0	10,088
College or university	1,672	6.6	107	1.9	1,779

Part B

Percentages of "Illeg," "Prenup" and "Partly" Classes, by Extent of Formal Education

HIGHEST DEGREE OF FORMAL EDUCATION	ILLEG		PRENUP		PARTLY		TOTAL OF THREE CLASSES	
	White	Negro	White	Negro	White	Negro	White	Negro
Illiterate	3.6	14.3	0.8	1.7	5.7	28.6	9.5	44.6
Elementary schools	2.8	14.5	3.6	7.2	4.2	15.7	10.6	37.4
High school	2.5	12.7	3.5	11.5	2.2	10.4	8.2	34.6
College or university	1.7	5.6	1.0	7.5	0.9	4.7	3.6	17.8

Part C

Illiteracy Percentages

ILLITERACY PERCENTAGE IN	WHITES	NEGROES	BOTH RACES
Present sample	2.1	5.2	2.5
Females in states from which present sample was drawn, 1930 (Ages 15 and over)	3.3	7.4	3.5
Females in U. S. A., 1930 (Ages 15 and over)	3.1	16.7	4.4

Table 5. Education.

indicates more educational training) than the general population from which it came. This would seem to be not only a harmless divergence, but indeed a satisfactory one rather than otherwise, considering the basic objectives of the present investigation as a whole. The percentage of illiteracy among the Negroes in the present sample is less than a third of that in the general population of the country as a whole. But this is reasonably to be expected since we are dealing only with urban and nearby suburban dwellers. Negro illiteracy is much higher generally in the rural South than in large cities located farther north.

Part B of Table 5 brings out the interesting fact that (with a curious and so far unexplained discrepancy in respect of illiterate white and Negro PRENUP) the overt consequences of loose sexual morality diminish with increasing extent of formal education. It would be rash in the extreme to conclude from the figures that adherence to a high code of sexual morality increases with extent of formal education, because in fact the data give no warrant for such a conclusion. Just possibly the precise opposite may be the case. All that the figures in Part B definitely demonstrate is that, in this sample, the overt consequences of sexual immorality expressed in pregnancy are less frequent proportionally (with the discrepancy noted above excepted and reserved) the higher the extent of formal education, in both whites and Negroes. A crude but reasonable way of putting the matter is that while more highly educated girls may or may not be more moral than their educationally less fortunate sisters, at least they know better, on the average, how to forefend the dire consequences of such excursions as they may choose to make into the realm of amatory dalliance.

In concluding this section of this progress report it may be of interest, and proper, to say that in all other respects where it has so far been possible to examine carefully and critically into the question of the representative character and adequacy of the sample the results have been generally of the same sort as those presented here. That is, the results have indicated that the sample is justly representative of the general population from which it was drawn. Naturally in the final report this matter will be gone into in much further detail. But up to this time each day's further critical analysis of the whole body of data has increased confidence in their validity and fundamental soundness.

IV

We turn now to brief consideration of some fragments of the definitive *results* relative to the main objectives of the inquiry.

Table 6 presents condensed figures as to the frequency of the

Part A. Whites

PRACTICE OF CONTRACEPTION	INWED		OUTWED		PARTLY		TOTALS	
	Num- ber	Per Cent	Num- ber	Per Cent	Num- ber	Per Cent	Num- ber	Per Cent
TOTAL	22,965	99.93	1,503	100.0	848	100.1	25,316	99.92
No contraception	11,849	51.6	1,322	88.0	511	60.3	13,682	54.0
Contraception attempted in some form	10,318	44.9	177	11.8	311	36.7	10,806	42.7
No contraception stated, but record doubted	792	3.4	4	.2	16	3.1	822	3.2
No information	6	.03	—	—	—	—	6	.02

Part B. Negroes

PRACTICE OF CONTRACEPTION	INWED		OUTWED		PARTLY		TOTALS	
	Num- ber	Per Cent	Num- ber	Per Cent	Num- ber	Per Cent	Num- ber	Per Cent
TOTAL	3,571	100.0	1,235	100.0	827	100.0	5,633	100.0
No contraception	2,828	79.2	1,152	93.3	696	84.2	4,676	83.0
Contraception attempted in some form	717	20.1	82	6.6	126	15.2	925	16.4
No contraception stated, but record doubted	26	.7	1	.1	5	.6	32	.6
No information	—	—	—	—	—	—	—	—

Table 6. Contraception.

practice of contraception. Considering first the totals for the whites it is seen that 42.7 per cent of the women had practised contraception before the time of record, regularly or intermittently, intelligently or stupidly, as the case may have been. Fifty-four per cent of the women stated that, to the time of record, they had never practised contraception. The medical cooperators who took and recorded their reproductive life histories for this investigation found no reason in their demeanor, behavior, or histories to doubt their statements. Nor did the writer, who went carefully and critically over every detail of each individual history with this particular point in mind, find any internal evidence in the history itself to justify doubt as to its truthfulness on this point.

In addition to this 54 per cent of the white women 822, or 3.2 per cent, also stated that they had never practised contraception, but either the medical cooperators or the writer, or both, found reason to doubt their statements on the point. If a woman's record showed too long gaps between pregnancies, unexplained in the history by illness or otherwise, and she affirmed that she had not practised contraception, her record was forthwith thrown into the doubtful category. Doubtless this was unjust to many women—they probably were in fact telling the truth—but the adoption of the procedure followed had the effect of measurably increasing confidence in the residual 54 per cent accepted as not practising contraception. Later in this paper statistical evidence will be presented that indicates that the pregnancy rates shown by these women objectively justify in high degree this confidence. In passing it may be of some interest to note that, of the 822 white women whose statements that they had never practised contraception were doubted, 44.6 per cent were Catholics.

For six white women out of the total of 25,316 it was impossible to get any clear information as to whether contraception was practised or not. This was chiefly because of their low level of mentality.

Among the Negro women only 16.4 per cent in total had practised contraception. As for the remainder, 83 per cent of the total stated that they had never done so, and no reason was found by anybody to doubt their statement. This left thirty-two women, or 0.6 per cent, whose statements that they had not practised contraception were doubted for one reason or another.

As would be expected the proportion of women practising contraception in both racial groups is much higher in the INWED class than in either the OUTWED or PARTLY. Obviously one important reason why most of the women who found themselves in these latter two unenviable classes did so was that they had failed to control conception.

There are two classes of women that do not appear in the present sample by reason of the way in which it was collected. These are:

(a) Women who were themselves permanently sterile physiologically or belonged to matings that were permanently sterile.

(b) Women who on all other grounds might have been included, but who did not become pregnant between about October, 1930, and April, 1932. Presumably some portion of these women did not become pregnant because they were effectively practising contraception during this period. Of such women two categories may be distinguished; namely (1) those who desiring a family, but a small one, did not time a pregnancy to fall into the period covered by this study, and (2) those who desired never to have any children at any time, and successfully and effectively practised contraception to the realization of that end.

It is reasonable to suppose that if there were a just representation of women of category (a) in the sample it would tend to raise by a small amount the total percentage in Table 6 of those not practising contraception, on the ground that sterile women and women in sterile matings seem in actual experience to discover their sterility fairly soon after marriage and stop attempts at contraception.

Of the women in category (b) those in the two subclasses are on a somewhat different footing statistically. Those in subclass (1) may probably safely be completely disregarded so far as concerns any potential effect they might be supposed to have upon the percentages of Table 6. The reason for this opinion is found in the great statistical stability of official birth statistics from year to year relative to age and other characteristics of the mothers involved. For the most part the women who appear as mothers in the birth statistics of calendar year $n + 1$ are individually different women from those who appear as mothers in the statistics of the year n . Yet the relative age distributions of mothers of the years n and $n + 1$ are almost precisely identical. By parity of reasoning it appears probable that the proportion of women practising contra-

ception among mothers of one year will not be greatly different from the proportion among mothers of the previous year, except insofar as it may be increased by women beginning for the first time in their lives the practice of contraception—that is leaving the “no contraception” cohort to which they had always previously belonged and passing over into the “contraception” cohort. The proportion of such new recruits in the total at any given moment is probably not large, but this proportion is probably increasing more rapidly per unit of time under present conditions than it has in the last fifty years, and doubtless will continue to increase.

But if we consider not the percentages of Table 6, which are by definition percentages of *mothers*, and consider inferentially the percentages of *women* in the whole population exposed to risk of pregnancy (*i.e.*, indulging in sexual intercourse) it is reasonable to suppose that the percentage of them practising contraception will be somewhat, but probably not greatly, higher than that of Table 6, because of the existence of the subcategory (b) (1).

Finally it is reasonable to suppose that there may be some women really falling in the subcategory (b) (2), that is, women not physiologically sterile but actually never pregnant because of their unfailingly effective practice of contraception from first coitus to menopause. But all the evidence available appears to indicate that the percentage of such women in the general population must be small. It would doubtless be somewhat larger if absence of live births were taken as the criterion of a sterile mating (as in Notestein's analysis of census data) than if the criterion were taken to be absence of any product of conception. Thus it would be statistically tempting, but probably biologically dubious, to charge all the increase in sterility percentages between 1890 and 1910 found by Notestein⁴ to the practice of contraception by women in the subcategory under discussion.

⁴ Notestein, F. W.: The Decrease in Size of Families from 1890 to 1910. *Milbank Memorial Fund Quarterly Bulletin*, October, 1931, ix, No. 4, pp. 181-188.

To summarize the necessarily brief discussion of the matter that can be undertaken here it seems probable that the percentage of white women definitely recorded in Table 6 as practising contraception somewhat underestimates the corresponding percentage for the general population from which the sample was drawn, but not greatly so. Considering the fact that the figures of Table 6 include all ages; all durations of marriage; the whole range of variation in number of pregnancies experienced; and all sorts of social, economic and educational levels, it would seem hazardous to estimate the percentage of white contraceptors among the women in the general population of the fifteen states dealt with at more than 55 to 60 per cent (that is, $42.7 + 3.2 +$ about 10 to 15).

This estimate will be objected to by some as too low. It will be pointed out that women coming to birth control clinics for the first time show a much higher percentage than those reporting here to have previously attempted contraception.⁵ But women attending upon birth control clinics are known to be a highly selected and differentiated group. It has been shown by the writer⁶ that they are a much more fertile group than the generality of women. Furthermore as a group they are heavily overweighted with multipara,⁷ and the present material shows unequivocally an increase in contraceptive practices with increasing number of pregnancies experienced. Relatively few women, aside from those in the uppermost social and economic strata, begin contraception in the first years of conjugal life.

An interesting additional sidelight is thrown upon this discussion by the following figures. Considering only white women mar-

⁵ Cf. Robishaw, R. A.: A Study of 4,000 Patients Admitted for Contraceptive Advice and Treatment (*American Journal of Gynecology and Obstetrics*, 1936, 31, pp. 426-434), where the percentage is put as "at least 85."

⁶ Pearl, R.: Statistical Report on the Fourth Year's Operations of the Bureau for Contraceptive Advice. *Fourth Report*, Bureau for Contraceptive Advice, Baltimore, pp. 3-15, 1932.

⁷ Seventy-eight per cent of Robishaw's (*loc. cit.*) 4,000 cases had been pregnant two or more times at admittance. The experience of the Bureau for Contraceptive Advice in Baltimore (Pearl, *loc. cit.*) showed 92 per cent of this status.

ried once only and free of gynecological disease, the data show that, among the total number of women exposed to risk of becoming pregnant in each age period, the following percentages *had practised contraception*, in some form or other.

<i>Age Period</i>	<i>Per Cent Who Had Attempted Contraception</i>
10-14	33.2
15-19	43.3
20-24	53.1
25-29	57.2
30-34	55.2
35-39	49.9
40 and over	39.7

It will be seen that these figures tend to confirm the writer's estimate stated above of 55 to 60 per cent as a maximum for the general population from which the present sample was drawn.

After prolonged study of the matter and examination of all the available evidence the writer has come to the conclusion that the proportion of married women in the general population practising contraception is a statistic that cannot be precisely determined or proved. The best that can be hoped for is a judgment that shall take into account as justly as may be all the evidence direct and indirect. The writer's present judgment on the point has been stated above. It is not to be regarded as dogmatic or final, but on the contrary is subject to revision whenever any new sort of evidence appears that warrants a change. It merely represents the best present judgment of one student of the problem.

One final word as to the Negro women: There seems to be no reason to doubt that the percentages of Part B of Table 6 represent with substantial accuracy the relative frequency of contraceptive practices in the particular general population from which the present sample was drawn. They indicate that roughly only about a third as many Negro as white women resort to contraception. It seems probable that there will be little serious disagreement with

Part A. Means

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. P. E. DIFF.
	N	Mean	N	Mean		
10-14	203	4.19±.57	147	7.03±.98	+2.84±1.09	2.6
15-19	5,080	16.87±.21	1,688	16.05±.36	-.82±.42	2.0
20-24	6,605	15.56±.16	1,608	14.00±.30	-1.56±.34	4.6
25-29	4,132	12.55±.17	883	10.70±.28	-1.85±.33	5.6
30-34	2,092	10.32±.20	378	10.98±.44	+.66±.48	1.4
35-39	909	11.64±.33	122	12.21±.77	+.57±.83	0.7
40 and over	226	14.63±.81	27	11.80±1.71	-2.83±1.89	1.5

Part B. Medians

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. P. E. DIFF.
	N	Median	N	Median		
10-14	203	0.60±.71	147	0.69±1.23	+0.09±1.42	0.06
15-19	5,080	8.14±.26	1,688	7.97±.45	-.17±.52	0.33
20-24	6,605	8.34±.20	1,608	8.37±.38	+0.3±.43	0.07
25-29	4,132	7.16±.21	883	7.25±.35	+.09±.41	0.22
30-34	2,092	6.19±.25	378	6.89±.55	+.70±.60	1.17
35-39	909	6.84±.41	122	8.44±.97	+1.60±1.05	1.52
40 and over	226	7.27±1.01	27	6.50±2.14	-.77±2.36	0.33

Table 7. Pregnancy rates per 100 computed ovulations in women not practising contraception, married once only, and without any gynecological disease.

this figure on the part of those acquainted with the sex attitudes and *mores* of the American Negro.

Table 7 presents the mean and median pregnancy rates⁸ (pregnancies per 100 computed ovulations) in quinquennial age periods of exposure to risk of pregnancy, for all the women in the sample who (a) had never practised contraception; (b) had been married once only; and (c) had no form of gynecological disease. The object of this table is to set forth as accurately as the data permit what may be regarded as the *normal fertility* of a sample of American women pregnant in 1930-1932.

The data of Table 7 are shown graphically in Figures 1 and 2.

⁸ For a description of the reasoning on which these rates are based, and the method of computing them see the writer's second progress report cited in footnote 2.

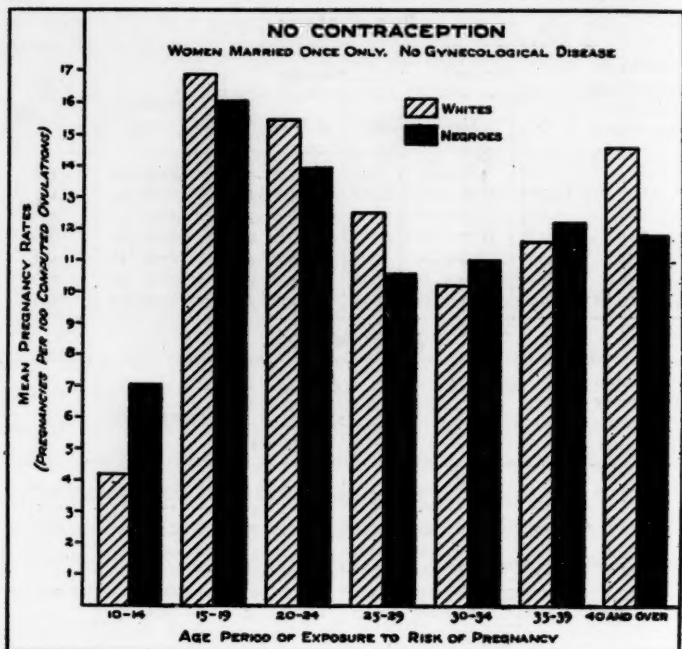


Fig. 1. Mean pregnancy rates for white and Negro women not practising contraception, married once only, and free of gynecological disease.

The first point that is evident from the figures of Table 7 (and also those of the following Tables 8 and 9) is that the pregnancy rate frequency distributions at all age periods are extremely skew, having a heavy piling up of frequency at the lowest rates, and then stretching out over a long range of higher rates with low frequencies. On account of this extreme skewness of the distributions the median is the centering constant of choice. It is more stable and more truly representative of the general situation.

On account of the limitations of time available it will be possible to discuss but two of the main results that emerge from the data of Table 7. The first of these relates to the form of the curves of means and medians relative to age periods of exposure. The classical form

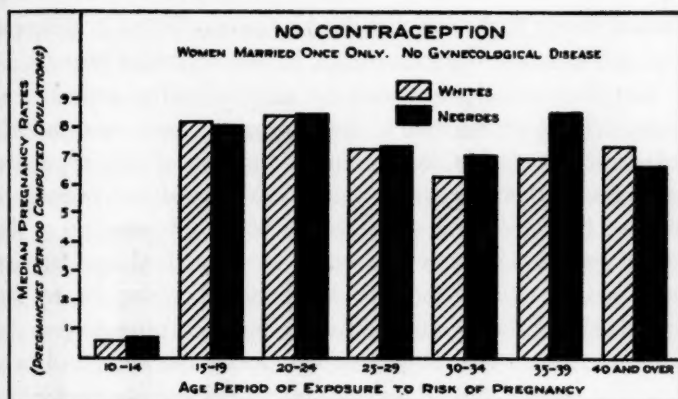


Fig. 2. Like Fig. 1 but for median pregnancy rates.

of age fertility curve is that of Tait, predicated upon the data of Matthews Duncan, and in its broad features confirmed by Körösi and many later workers. It runs, as Tait originally stated it, for a total fertility (family size) of 12, as follows:

Age	Fertility
15-20	12
20-25	8.9
25-30	6.0
30-35	3.7
35-40	2.0
40-45	0.6
45-50	0.1

The means or medians of Table 7 are not like this at all. They rise from a low point in the age period 10-14 to a high level at 15-19. That high level is maintained in the 20-24 period. Thereafter it slowly declines to the 35-39 period where it again rises, and in the 40 and over period it reaches practically the initial high level of early life.

What is the reason for this wide discrepancy from the results of such sound workers as Matthews Duncan and Körösi? The answer

is found chiefly in the fact that the data were collected in different ways and represent different things, in two important respects. In the first place in the present data the same individual women contribute to the determination of the value of the mean rates in each and every age period falling within the durations of their respective marriages. In short the whole reproductive life of each woman is followed throughout the whole course of its unfolding up to the date of record. Duncan's and other later standard age fertility curves, on the other hand, are determined, in principle, by the examination of the ages of mothers of births in a single year. In consequence each individual woman appears but once, and in a particular age period. In the second place, owing to the method in which the present data were collected it results that the only women represented *in the final 40 and over age period* were women who were pregnant at least once in that period. Women exposed to risk of pregnancy in that period who did not become pregnant in the period simply are not represented at all. The same is true in some degree, but a progressively lessening one, in each of the earlier age periods.

The rates upon which Table 7 is based are basically rates of the type

$$(A) = \frac{\text{Number of pregnancies in an age period}}{\text{Total women-years exposure to risk of pregnancy in the same age period of women who actually became pregnant in that or some later period}}$$

whereas the usual expression of a fertility rate is of the type

$$(B) = \frac{\text{Number of births in an age period}}{\text{Total number of women potentially capable, because married, of becoming mothers in the same period}}$$

Obviously these are quite different kinds of rates, and will lead to quite different numerical results. But while rates of type (A)

cannot be directly compared with those of type (B), any two rates of type (A) may as justly be *compared with each other* as may any two rates of type (B) be compared with each other.

In simplest terms, one statistical situation connected with the fact that in the present material each woman's reproductive history is continuously followed to the date of record may be put this way: As a matter of observation only a small percentage of all married women upwards of 40 years of age ever become pregnant, but a high percentage of all such women (*i.e.*, those who become pregnant at that age) have been extremely fertile throughout their lives. In lesser degree, but still to a marked degree, the same two things are true about women in the 35-39 age group and so on back, *mutatis mutandis*. The consequences of these relations in determining mean and median pregnancy rates as in Table 7 are evident without further discussion.

In the final detailed treatment of the present data certain other fertility rates will be discussed that will bring out in detail the relationship of the present type of fertility data to the conventional type derived from age specific natality data from general populations. Limitations of time and space forbid going further into such discussions here.

The second main result of Table 7 that can be discussed here is the close agreement between the mean and median fertility rates of whites and Negroes, in the absence of contraception. This result was tentatively set forth in the second progress report. It is now abundantly confirmed by the whole material. In the case of the means, the Negro rates are lower than the white in four age periods, and higher in three. Furthermore in the only two age periods where the differences can be regarded as significant in comparison with their probable errors, the Negro mean is lower than the white. In the medians, that are as has already been noted the more reliable centering constants in this case, no difference at any age period even approaches statistical significance.

Part A. Means

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. P. E. DIFF.
	N	Mean	N	Mean		
10-14	39	2.71±.72	14	4.18±1.12	+1.47±1.33	1.1
15-19	1,526	9.22±.26	167	12.70±.86	+3.48±.90	3.9
20-24	2,620	10.35±.18	193	13.30±.93	+2.95±.95	3.1
25-29	1,660	9.47±.21	104	11.30±.90	+1.83±.92	2.0
30-34	746	8.99±.32	45	10.18±1.02	+1.19±1.07	1.1
35-39	280	8.97±.47	16	12.22±1.65	+3.25±1.72	1.9
40 and over	51	15.75±2.02	2	—	—	—

Part B. Medians

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. P. E. DIFF.
	N	Median	N	Median		
10-14	39	0.59±.90	14	0.70±1.41	+0.11±1.66	0.07
15-19	1,526	4.71±.33	167	7.19±1.08	+2.48±1.13	2.2
20-24	2,620	5.98±.23	193	8.15±1.16	+2.17±1.18	1.8
25-29	1,660	5.34±.26	104	7.00±1.13	+1.66±1.16	1.4
30-34	746	4.87±.40	45	6.50±1.28	+1.63±1.34	1.2
35-39	280	4.84±.59	16	9.00±2.07	+4.16±2.15	1.9
40 and over	51	9.10±2.53	2	—	—	—

Table 8. Pregnancy rates per 100 computed ovulations in women practising some form of contraception regularly and steadily without intermission. Women married once only, and without any gynecological disease.

There are two pertinent consequences of this result. In the first place it contributes an interesting and significant anthropological and sociological datum. In the second place, it strongly supports the view that substantially all of the 54 per cent of white women who said they had never practised contraception up to the time of record were not lying.

For comparison with Table 7 two further tables are presented dealing with women who practised contraception in different ways. Table 8 gives mean and median pregnancy rates for women (a) who not wanting children up to the time of record practised contraception regularly and steadily throughout their married lives to the best of their, on the record, somewhat feeble abilities,

never intermitting it intentionally for any reason whatsoever; (b) who had been married once only; and (c) who were free of any gynecological disease.

If the means and medians of Table 8 are compared, age period by age period, with those of Table 7 it will be seen that the practice of contraception in the manner described resulted generally in lower pregnancy rates among the whites than those experienced by women not practising contraception at all. Among the Negro women the resulting differences in pregnancy rates are extremely slight, and wholly insignificant either statistically or biologically.

Among the white women, the median pregnancy rates achieved with the dogged, unintermitted, but obviously stupid practice of contraception bore the following percentage relations to those exhibited by the women of Table 7 not practising contraception at all.

<i>Age Period</i>	<i>Percentage</i>
10-14	98.3
15-19	57.9
20-24	71.7
25-29	74.6
30-34	78.7
35-39	70.8
40 and over	125.2

In general terms it is evident that the diligent contraception of these women, except in the 15-19 age period, yielded only a meager 20 to 30 per cent dividend in the way of surcease from the troublesome consequences of coition instead of the intended 100 per cent.

It is interesting to note that the differences between whites and Negroes in Table 8 are uniformly positive—that is the Negro mean and median rates are at every age period greater than those for the whites. But in the case of the medians, upon which most reliance may be placed, no difference approaches statistical significance. This is probably chiefly a consequence of the small size of the Negro sample. Tentatively these results may be interpreted to indi-

Part A. Means

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. — P.E. DIFF.
	N	Mean	N	Mean		
10-14	6	—	2	—	—	—
15-19	646	5.54±.26	25	11.54±2.04	+6.00±2.06	2.9
20-24	1,771	5.21±.12	23	11.50±2.36	+6.29±2.42	2.6
25-29	1,400	6.82±.19	15	6.33±1.21	-0.49±1.22	0.4
30-34	559	8.48±.37	5	—	—	—
35-39	150	11.59±.90	1	—	—	—
40 and over	19	17.26±3.44	0	—	—	—

Part B. Medians

AGE PERIOD OF EXPOSURE TO RISK OF PREGNANCY	WHITES		NEGROES		DIFFERENCE	DIFF. — P.E. DIFF.
	N	Median	N	Median		
10-14	6	—	2	—	—	—
15-19	646	0.92±.33	25	6.50±2.56	+5.58±2.58	2.2
20-24	1,771	2.98±.15	23	4.50±2.96	+1.52±2.96	0.5
25-29	1,400	3.70±.24	15	4.13±1.52	+0.43±1.54	0.3
30-34	559	4.51±.46	5	—	—	—
35-39	150	6.07±1.13	1	—	—	—
40 and over	19	7.50±4.31	0	—	—	—

Table 9. Pregnancy rates per 100 computed ovulations in women intermitting the regular, steady, and continuing practice of contraception only for the production of planned children. Women married once only and without any gynecological disease.

cate that operating upon a physiological base of equal fertility in the two races, the same general manner of practising contraception produces results among the Negro women far less effective than even the relatively poor ones the white women are able to achieve.⁹

Attention may now be turned from the mode of contraceptive practice that the present material has shown to be, on the whole, the least intelligent to the most intelligent. Table 9 furnishes the data. It gives the mean and median pregnancy rates for women who (a) intermitted their practice of contraception only for the purpose of producing wanted and planned children when they

⁹ For further evidence on this point see Pearl, R.: Fertility and Contraception in Urban Whites and Negroes. *Science*, May 22, 1936, 83, pp. 503-506.

wanted them; (b) had been married once only; and (c) were without any gynecological disease. Let it be emphasized that every single pregnancy entered in Table 9 was a wanted pregnancy, deliberately planned.

It is evident at once from Table 9 that too few of the Negro women in the whole material to be of any statistical use rose to the high level of combined rigid and unfailing self-control, on the one hand, and fairly expert knowledge and aptitude in the recondite field of the physiology of reproduction, on the other hand, that is implicit in the composition of Table 9. So then attention must be confined to the white women.

The median pregnancy rates of the white women in Table 9 had the following percentage relations to (A) the women of Table 7 not practising contraception at all, and (B) the women of Table 8 who did nothing but practise contraception:

Age Period	Percentage A	Percentage B
10-14	—	—
15-19	11.3	19.5
20-24	35.7	49.8
25-29	51.7	69.3
30-34	72.9	92.6
35-39	88.7	125.4
40 and over	103.2	82.4

To facilitate comparison the median pregnancy rates for white women as set forth in Tables 7, 8, and 9 are shown graphically in Figure 3.

These results are not easy of interpretation, and no attempt will be made at this stage of the investigation to express any final or definitive judgment as to their meaning. What they suggest is that these women producing only planned children kept their pregnancies down in the early age periods to very low figures compatible with the wanted small ultimate family size; and that as they got past thirty either the desire for more children got stronger,

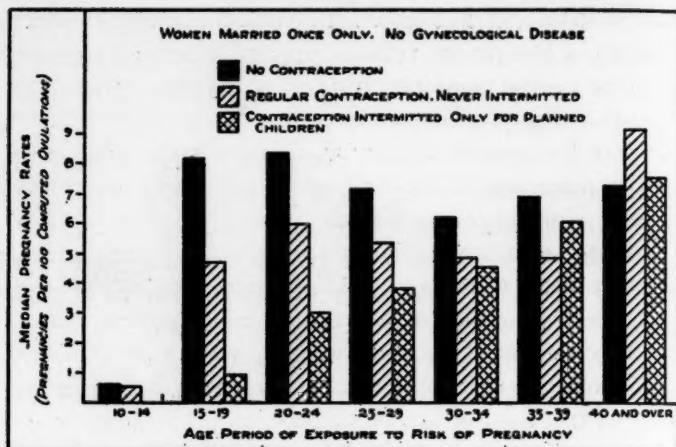


Fig. 3. Median pregnancy rates for white women, by age periods of risk of becoming pregnant, and by different types of contraceptive practice.

or the delay after each interruption of contraception before the wanted pregnancy appeared grew longer and longer, until, in fact, either as a result of one or both of these causes, their actual pregnancy rates were but little below those of women in the same age periods not practising contraception at all. It appears as though among the women included in Table 9 an important psychological factor entered the picture in the later age periods. Their ability effectively to control conception by contraceptive techniques now available is demonstrated by their performance in the earlier age periods. But on the record it seems that as they approached closer and closer to the end of their reproductive lives they *wanted* children at a rate not much different from that at which women who did nothing about contraception *had* children in the same age periods.

V

The more significant points brought out in this progress report may be briefly summarized as follows:

1. The sample of 30,949 women from twenty-six large cities in

fourteen states and the District of Columbia, for which complete reproductive histories are available, appears to be fairly representative of the general population from which it was drawn in respect of relative degree of illegitimacy, religious preference, nativity (native or foreign-born), extent of education, particularly as indicated by percentage of illiteracy, and in all other respects that it has been possible so far to analyze.

2. Of the white women in the sample 10,806, or 42.7 per cent, and of the Negro women 925, or 16.4 per cent, had practised contraception before the time of record, in some manner or other. In total, 57.2 per cent of the white women, and 83.6 per cent of the Negro women denied the practice of contraception, but the statements on this point of 822, or 3.2 per cent, of the white women, and 32, or 0.6 per cent, of the Negro women, were doubted for one reason or another, leaving respectively 54.0 per cent of white and 83.0 per cent of Negro noncontraceptors about whose statements no reason for doubt was found, either in their reproductive histories or in any other circumstance or respect. It is the opinion of the writer, for reasons stated in the body of this paper, that the percentage of white contraceptors in the sample somewhat underestimates the percentage of such women in the general population from which the sample was drawn, but not by a large amount. In his judgment the actual percentage of white contraceptors in the general population from which the sample was drawn is probably of the order of 55 to 60 per cent.

3. An analysis of the mean and median age specific pregnancy rates of women not practising contraception, married once only, and without any gynecological disease, shows that under these conditions the median pregnancy rates of white and Negro women are identical in each quinquennial age period of exposure to risk to pregnancy from 10-14 to and including 40 and over. The same is also true for the age specific mean pregnancy rates, save for two age periods, where the difference between the two racial groups is

probably statistically significant. But in both of these cases the Negro means are *lower* than those for the whites. It is furthermore pointed out that because of the skewness of the rate distributions the median is the more reliable centering constant in the premises.

4. An analysis of the age specific mean and median pregnancy rates of white women practising contraception regularly and steadily throughout their married lives, without intermission of any sort (because they desired no children at all) married once only and free of gynecological disease, shows that this type of contraceptive practice led generally to a reduction of median pregnancy rates below those of noncontraceptors in the same age periods, of only about 20 to 30 per cent on the average. This is interpreted as an expression of the relative lack of intelligence and effectiveness of these women relative to their practice of contraception. Among the Negro women in the same category the reduction of pregnancy rates was insignificantly slight.

5. White women intermitting their practice of contraception *only* for the purpose of producing wanted children deliberately planned to be produced at a particular time, married once only, and free of gynecological disease, reduced their mean and median age specific pregnancy rates below those of noncontraceptors in the same age periods by large amounts in the earlier age periods, but only by small amounts in the later age periods, presumably because in these later age periods their desire for children was not markedly different from their inherent physiological ability to produce them at those ages.

EDUCATION AND INTRAMARITAL FERTILITY IN STOCKHOLM

by E. P. HUTCHINSON¹

WITH the recent growth of interest in demographic studies of human fertility, there has become apparent a distinct trend from the descriptive to the comparative and analytical type of study. In particular, the focus of scientific attention has come to be less on the birth and fertility rates of geographically or politically separate areas and more on the relative fertility of different social classes living together within the same districts. Differences so observed have received the name of social class differentials in fertility.

Of the various types of demographic studies indicating the relation of social status to fertility, perhaps the earliest wide-scale investigations compared the birth rates of different wards or districts of large cities, roughly classifying these districts according to the predominant character of their inhabitants.² Since the time of these early studies, very considerable advances have been made in the technique of investigating social class differentials, notably improvements in the statistical measures of fertility and in the original data employed. In the place of crude birth rates there have been substituted various other measures of fertility which are of considerably greater precision and reliability. Instead of treating political divisions as units, later studies generally have employed more detailed data to provide better indices of social status and to permit a greater homogeneity within the groups compared. It is notable, however, that these refinements of method have brought no change of result. That is, quite regardless of the particular measure of fertility, the index of social status, or the type of data

¹ Department of Sociology, Harvard University.

² See for example Newsholme and Stevenson: *The Decline in Human Fertility as Shown by Corrected Birth Rates. Journal of the Royal Statistical Society*, 1906, 69, pp. 66-67.

used, the fertility rates of the upper social classes have been observed to be consistently less than those of the lower classes, however defined. It has therefore become almost axiomatic that human fertility, at least for those population groups with which we are best acquainted, is inversely related to social status.

Well established as this rule may appear to be, however, there is nevertheless some recent evidence that it is not without its temporary or local exceptions. In fact, there have appeared in recent years a few scattered observations of a reversal of the accepted social differentials of fertility. Among the earliest and most authentic of these observations are those of Karl Arvid Edin in Stockholm.³ On the assumption that these observations in Stockholm are valid, their significance depends on whether the reversal there of the normal fertility differences is a temporary matter, a purely local phenomenon, or a natural consequence of the almost world-wide tendency towards a progressively greater limitation in the size of families. If one is to predict the future course of population, it is hardly adequate merely to project the present downward trend of birth rates or to select some arbitrarily determined line as the lower asymptote of the birth rate curve. The falling birth rates which we are observing undoubtedly reflect important shifts in the relative fertility of different sections of the population; for the prediction of the future course of the birth rate (or of the social differentials in fertility) it is not altogether improbable that the Swedish experience may be of value. Certainly, the voluntary limitation of the number of births has progressed relatively far in Sweden, and it is possible that the Stockholm observations bear witness of a final stage in this development, the spread of rigorous limitation to the lower classes.

In order to make some of this Swedish material available to an

³ Including Almqvist and Wicksell: *Vårt moderna Befolkningsproblem, Sexuell Hygien*, Uppsala, 1927, pp. 80-93. Also, PROCEEDINGS OF THE WORLD POPULATION CONFERENCE, 1927. London, Edward Arnold and Company, 1927, pp. 205-207, as well as numerous later reports.

English-reading public, and to reexamine the evidence for the existence of the exceptional fertility differentials in Stockholm, a brief report on some of Karl Arvid Edin's investigations has been prepared recently.⁴ In the report is given, by illustration, a review of available Swedish population data and their possible uses in demographic research, together with an account of the Stockholm situation as revealed by analysis of some of this material. For the benefit of those who have not had access to this book, there is presented here a summary of one section, a discussion of the observed relation of education to intramarital fertility.

CHOICE OF MATERIAL AND METHOD⁵

Preliminary to any study of social class differentials in fertility is a careful selection of the original data and the method of analysis to be employed. The requirements to be met in making this selection are not only for accuracy of material and method but also for their nice adjustment to the problem at hand. In the study to be reviewed below the problem was how best to determine the relative fertility of different social groups in Stockholm. A first restriction of the scope of study was to limit it to intramarital fertility, excluding data for illegitimate births. Three questions of procedure remaining were:

1. What data to assemble.
2. What measure of fertility to apply.
3. What index of social status to employ.

With regard to the original material of fertility studies, two types of official natality data exist, the one obtained by the continuous registration of births and still-births, the other by retrospective census reporting. Data of the former type give a cross-sectional picture of the fertility at a given instant or interval of time, while

⁴ Edin, Karl Arvid and Hutchinson, E. P.: *Studies of Differential Fertility in Sweden*, STOCKHOLM ECONOMIC STUDIES, NO. 4. London, P. S. King and Son, 1935. American distributor, Population Association of America, Washington, D. C.

⁵ For a more detailed description of the material and methods see Edin and Hutchinson, *ibid.*, pp. 17-29, 69-74.

retrospective data of the census type record fertility over the preceding years of marriage. Neither of these sources is without its technical shortcomings, but for the particular study reported here the census type of information was preferred as giving assurance that whatever fertility differentials might be observed were not merely temporary.

A further advantage in using census data is that both natality and population figures are obtained in the same way and are presented together, this assuring uniform classification of births and parents into whatever social categories may be employed. An attendant difficulty, however, is that this classification must be based upon status as reported at the time of the census, and that the reported status of parents may be different from that at the time of birth of their children. As will be seen below, the index of social status used in this report was so chosen as to obviate this difficulty, but in order to obtain income data relative to the early years of marriage a "double census" method was employed. This consisted, in brief, of identifying Stockholm families in both the 1920 and the 1930 census returns, selecting families formed shortly before the 1920 census, obtaining a statement of income from the 1920 report and a record of the number of children born from the 1930 information.

Families meeting the following four conditions were selected:

1. Marriage in the years 1917 to 1920 inclusive.
2. Wife less than 35 years old at marriage.
3. Husband and wife living together in Stockholm in both 1920 and 1930.
4. Family found in the returns of both censuses.

All Stockholm families meeting these specifications were included in the study. Information concerning a total of 6,629 such families was obtained.

As a check on the completeness of the census data a search for record of children born to these families was made in three additional sources:

1. The Stockholm birth and death registers for the years 1917 to 1930, inclusive.
2. The Stockholm family register.
3. Maternity hospital records.

Included in the census returns for each family was a report of the number of children ever born, including those dying before the census date. To check the completeness of this reporting the birth and death registers were particularly valuable. The family register was a useful supplement to the birth registers in the case of families which had moved out of the city and returned between 1920 and 1930. An additional check was provided by the maternity hospital records which listed the previous confinements of the mother. In case of discrepancies a further search was made to establish the facts. Insofar as the natality data were concerned, therefore, they may be considered to have been complete.

The answer to the second question, concerning the measure of fertility to apply, was determined by the form of the material. The careful checking of the natality data having given reliable information about the date of all births and marriages it was decided to choose as the measure of fertility the average number of live births per family in the first decade of marriage. An advantage of this type of measure lies in its relative immunity to disturbance through temporary fluctuations in fertility; for convenience of terminology this type will be referred to as a "longitudinal" measure of fertility. As stated before, the marriages included in the study were those contracted during the four-year period, 1917 to 1920 inclusive, so that the first decade of marriage for all families ended between the first day of 1927 and the end of 1930. Births occurring after the tenth anniversary of marriage, even though before the end of the 1917-1930 study period, were excluded.

The final problem of procedure was that of choosing an index of social status. For each of the Stockholm families included in the study there were to be had three separate items of information

upon which a sociological classification might conceivably be based. These were (1) occupation of the husband as reported in the 1920 and 1930 census records; (2) income of the husband (and of the wife if having separate income) as reported in 1920 and 1930; (3) amount of education of husband and wife as reported in 1930.

No single one of these items was considered to be an adequate index of social status, but, in the original report, analysis of the fertility of the 6,629 Stockholm families was made with division according to all three of these items, separately and in various combinations, in such a way as greatly to reenforce the evidence for the existence of real social status differentials in fertility. An obvious defect of this procedure was that it merely indicated the presence, not the magnitude, of the social status differentials. With the existing lack of any single accepted criterion of social status, however, the procedure as outlined appeared to provide the most secure basis for generalizations concerning the relative fertility of groups differing in social status.

The Stockholm data reviewed below are those showing the relation of intramarital fertility to a single one of the three available bases for social classification, the amount of education. The reason for choosing this particular section of the material is, in part, because considerably less information is to be had concerning education group differentials than about occupation and income group differentials in fertility.⁶ Aside from studies of special groups such as college graduates, comparatively little direct information is available on degree of education in relation to the fertility of marriage. Education, however, is not without its theoretical and practical advantages as an index of social status. On the theoretical side it may be argued that the education of an individual, typically completed before he begins his independent career, is more directly

⁶ See Lorimer and Osborn: *DYNAMICS OF POPULATION*. New York, The Macmillan Company, 1934. Chapter IV.

related to the position into which he is born than is his income or even his occupation in later adult life. In opposition it may be noted that education is often the ladder of social mobility. This, however, is perhaps most true for the United States. For Sweden it may be stated with some confidence that the amount of education of children is more directly a function of the social status of parents. On the practical side, education as an index of social status possesses the very real advantage of remaining constant, barring a very few exceptional cases, throughout adult life, having in this respect a distinct superiority over occupation and income which may vary with age, stage of the business cycle, or change in place of residence.

EDUCATION OF HUSBAND AND INTRAMARITAL FERTILITY

Although the 1930 census records gave the degree of education of both husband and wife, it was found advisable in the analysis of this information to make the education classification with regard for only the husband's education. The reason for this, aside from the complication of using a double basis of classification, was that very few of the wives were to be found in the highest education categories.

Four education groups were employed in analysis, these being defined as follows in the original report:

A. "Folkskolan" or less, the "folkskolan" including the first eight years of education, from about the seventh to the fifteenth year of age.

B. Further education than "folkskolan" but without the matriculation examination.

C. With matriculation examination, usually taken at about age 18 or 19 and required for admission to universities and to the higher civil service positions.

D. Degree from university or higher technical school.

In Table 1 is given the total number of families falling into each of the education categories, the figures being subdivided according to the age of the wife at marriage. It is to be noted that the age distribution of the wives at marriage did not vary greatly from

one education group to another. The age distribution of the husbands, however, may be expected to have been less uniform.

In the same table is given the total number of live births in each subgroup of families during the first ten years of marriage, together with the average number of live births per family in this period. In these latter figures, which are used as a measure of intramarital fertility, a very considerable regularity appeared, there being a consistent decrease in fertility with increase in the age of wife at marriage, and an equally consistent rise in fertility from the lowest to the highest education group. On the average the number of children born per family in the first decade of marriage was nearly fifty per cent greater in education group D than in group A (least education).

The observation is therefore one of higher fertility in the higher education groups, but it remains to be shown whether or not this

Table 1. Average number of live births in the first ten years of marriage, according to education of husband and age of wife at marriage, in 6,629 Stockholm families.¹

AGE OF WIFE AT MARRIAGE		EDUCATION OF HUSBAND ²				
		A	B	C	D	Total
TOTAL	Families	4,528	1,435	225	441	6,629
	Births	5,317	1,947	346	762	8,372
	Average	1.17	1.36	1.54	1.73	1.26
Under 25	Families	1,824	546	91	190	2,651
	Births	2,509	885	152	396	3,942
	Average	1.38	1.62	1.67	2.08	1.49
25-29	Families	1,762	614	91	173	2,640
	Births	1,968	800	146	267	3,181
	Average	1.12	1.30	1.60	1.54	1.20
30-34	Families	942	275	43	78	1,338
	Births	840	262	48	99	1,249
	Average	0.89	0.95	1.12	1.27	0.93

¹ This and the following tables were taken directly, or adapted, from Edin and Hutchinson, *ibid.*, where the original figures and more detailed tabulations may be found.

² Group A had the least schooling and Group D the most. For exact definition, see text page 291.

observation is entirely valid. In view of the nature of the data and the method of tabulation (in Table 1), the observed fertility differentials can not be attributed to inter-group differences in the age distribution of the wives or in the period of marriage being compared. Several other sources of noncomparability, however, remain to be considered before the observed education group differences in fertility may be accepted at face value.

FERTILITY IN THE FIRST THREE YEARS OF MARRIAGE

A limitation of the above observations is that they were for the first decade of marriage only, there being no information as to the number of children born to the 6,629 Stockholm families after 1930. It seems improbable, however, that the direction of the fertility differentials was in any way affected by the restriction of comparison to the first ten years of marriage, the greater part of intramarital fertility coming in this period. Furthermore, as is to be seen, the differences in fertility tended to become greater rather than less with increased duration of marriage (*see* Table 2).

A more serious potential difficulty, however, lay in the fact that at least the first years of the observation period (1917 to 1930) were highly abnormal. It is probably true that the use of a measure of total fertility over a ten-year period of marriage tended to smooth out the effects of temporary stimulants or checks to the birth rate since, for example, a temporary postponement of births in response to threatened insecurity was probably compensated for by an increase in births when the check was removed. Nevertheless, it is by no means inconceivable that conditions in the first years of the marriages were such as to affect the social differentials in fertility quite differently from the total birth rate. At any rate, it seemed advisable to remove any uncertainty as to the course of the fertility differentials in the early part of the study period.

A division of the natality data was accordingly made, separating births occurring in the first three years from those in the following

MARRIAGE PERIOD	AGE OF WIFE AT MARRIAGE	EDUCATION OF HUSBAND				
		A	B	C	D	Total
0-3 years	Under 25	0.83	0.96	0.87	1.16	0.89
	25-29	0.67	0.76	0.88	0.80	0.71
	30-34	0.53	0.53	0.72	0.72	0.55
	Total	0.71	0.79	0.84	0.94	0.75
4-10 years	Under 25	0.54	0.66	0.80	0.93	0.60
	25-29	0.45	0.55	0.73	0.75	0.50
	30-34	0.36	0.42	0.40	0.55	0.39
	Total	0.47	0.57	0.69	0.79	0.52

Table 2. Average number of live births per family in the first three years and in the succeeding seven years of marriage in 6,629 Stockholm families.

seven years of marriage. The division could be made with some accuracy because of the careful cross-checking of the original records to determine the true dates of the births and marriages. The purpose of the division was to demonstrate whether or not the observed differences in fertility between the education groups were products of temporary war period and immediate post-war disturbances in the birth rate.

In Table 2 is given the average fertility of the Stockholm families in the first three years and in the succeeding seven years of marriage, fertility again being expressed as the average number of live births per family in the given period rather than on a per annum basis. This separation of the births into the two groups of course increased the irregularity of the data to some extent, but in spite of subdivision the fertility of the upper education groups remained consistently the highest, both in the first three years and in the next seven years of marriage.

A possible objection to the evidence contained in Table 2 is that the first marriage period (0-3 years) did not refer to any definite calendar interval. In fact, it covered the years from 1917 to 1923 inclusive, the date of marriage being anywhere between the limits of January 1, 1917 and December 31, 1920. It follows then that the natality figures for the first three years of marriage can not be

interpreted directly as an index of the prevailing fertility in the first three years of the study period. In order to meet this possible objection, therefore, and to obtain more direct evidence as to whether or not the unexpected direction of the education group differentials in fertility was a result of temporary changes in relative fertility, a further subdivision of the original material was made to separate the data for the 1917 and 1918 marriages from that for the marriages contracted in 1919 and 1920. The separate tabulation of the number of births in the first three years of marriage was continued.

In spite of this further division of the material the direction of the observed fertility differentials remained as before, the average number of live births per family in the upper education groups being consistently the greatest. Inasmuch as the observation of a direct relation of amount of education to the fertility of marriages was to be made for not only the total Stockholm material but also for the first years of marriage, the later years of the first decade of marriage, the war-period marriages (1917 and 1918), and the immediate post-war marriages, it may be concluded that the greater fertility of the more educated was not a result of temporary changes in relative fertility during the abnormal years around 1920.⁷

ILLEGITIMACY AND THE FERTILITY OF MARRIAGE

In view of the above examination of the natality data and the "longitudinal" measure of fertility employed, it would appear that the greater fertility of the more educated groups was not merely temporary. A possibility which remains, however, is that the high illegitimate birth rate in Stockholm was in some way responsible. At first glance, the use of an index of intramarital fertility would appear to eliminate the factor of illegitimacy from the comparisons. With the comparison of groups presumably differing in social status, however, some direct disturbance may well remain—this

⁷ This conclusion refers only to the *direction* of the difference in fertility; there is no evidence that the observed *amount* of difference remained unaffected.

on the assumption of some association between social status and the frequency of illegitimate births.

If a "longitudinal" measure of fertility is being used, two possible disturbances of opposite effect on the social differentials in intramarital fertility may be noted. In the first place, the average intramarital fertility in the early years of marriage may be expected to be greater, other things being equal, for the group with the greater frequency of premarital conceptions since the "risk" period for births after marriage is considerably longer. In the second place, granting some voluntary limitation of the size of family, the observed fertility of marriage is probably less in families containing one or more children born before the marriage.

In order to remove one of these possible sources of noncomparability between the intramarital fertility rates of the education groups, a selection of the family records was made to remove all cases in which the wife was known to have borne children previous to the observed marriage (regardless of whether the child was illegitimate or the child of an earlier marriage). The information necessary for this selection was obtained from the maternity hospital records which, as noted above, gave report of earlier confinements. This information obviously was to be had for only those wives with at least one child born during the first ten years of marriage, and could not be depended on to be altogether complete. Nevertheless, the fact that by this method a report of one or more previous children was to be found for no less than 1,590 of the 6,629 wives is indication that the source material was not grossly incomplete—and incidentally that the influence of earlier births on the fertility of marriage was probably not a negligible one.

In Table 3 are given the total and average numbers of births for the 5,039 families in which the wife was not known to have borne children before the existing marriage. As we have seen, there was not complete assurance that a record of all the earlier births was found, but the fertility figures of the table do indicate the general

EDUCATION GROUP	NUMBER OF FAMILIES	PER CENT OF TOTAL	NUMBER OF BIRTHS	AVERAGE PER FAMILY
TOTAL	5,039	76.0	6,637	1.32
A	3,169	70.0	3,804	1.20
B	1,246	86.8	1,770	1.42
C+D	624	93.7	1,063	1.70

Table 3. Average number of live births per family in the first decade of marriage; 5,039 Stockholm families in which the wife was not known to have borne children previous to the observed marriage.

effect of the correction. The effect appears to have been slight. It may in fact be seen from comparison with Table 1 that the education group differentials in fertility remained practically unchanged. As was to be expected, removal of the cases with previous births produced some increase in the average fertility of marriage, but this increase occurred in all education groups.

The above procedure of course gave no correction for education-class differences in the proportion of births in the first nine months of marriage. It is by no means clear, however, that such a correction should be made since differences of this sort, if they exist, are an integral part of the social differentials in fertility. The only purpose of making such a correction in the present case would be to demonstrate whether or not the unusual fertility differentials observed for this group of Stockholm families could be attributed to class differences in the frequency of premarital conceptions. To judge by general information and by the percentages in the second column of Table 3, however, a correction for this factor would merely serve to increase the under-fertility of the lower education groups.

EDUCATION, INCOME, AND INTRAMARITAL FERTILITY

From the evidence of the data so far submitted it would appear that a direct relationship of amount of education to fertility of marriage really did exist for this group of 6,629 Stockholm families during the years 1917 to 1930. Insofar as can be discovered from the

data, this relationship was not merely a temporary post-war or war-period phenomenon nor was it a result of the relatively high illegitimate birth rates prevailing in Stockholm. Strictly speaking, however, the above observations do not constitute evidence that the amount of education of the husband was a primary variable directly affecting intramarital fertility. Educational status at best is merely an index of social status; furthermore, a classification according to education may be no more than a concealed classification according to income, occupation, or other sociological factors. The question is therefore whether or not education in itself influences the fertility of marriage.

The question in this form can not be answered, there being no possibility of isolating the single factor, education, from its many concomitants. What can be done, however, is to discover if the education group differentials in fertility persist after control of other sociological factors.

Two other possible indices of social status were to be had from the Stockholm family material—occupation and income of the husband. As has been noted, both of these factors have the disadvantage of being variable rather than constant throughout adult life so that the relative social status of a family, as determined for some particular time by reference to these items, may not be the same as during the years of most active child bearing. In the material dealt with here there was no particular error involved in basing the education status classification upon the 1930 census return for the husband even though his marriage had taken place ten or more years before. This was not true, however, for occupation and income. To meet this problem the solution adopted in the present study was to use the "double census" method whereby the 1920 census report of income and occupation was obtained.

Of these two factors, income and occupation, the former had been found to be the more significant in relation to fertility, analysis having shown that the occupation-group fertility differentials prac-

tically disappeared when allowances were made for differences in the distribution of amount of income. This being the case, the fertility rates of the education groups were analyzed according to

Table 4. Average number of live births per family in the first ten years of marriage, according to education and income of husband in 6,629 Stockholm families.

Income of Husband in Kronor	Education of Husband			
	A	B	C+D	Total
TOTAL	1.17	1.36	1.66	1.26
Under 4,000 per annum	1.15	1.18	1.46	1.16
4-6,000 per annum	1.18	1.34	1.45	1.21
6-10,000 per annum	1.18	1.35	1.46	1.31
10,000 or over per annum	1.56	1.61	1.85	1.74
Under 6,000 per annum	1.17	1.28	1.45	1.19
6,000 or over per annum	1.23	1.45	1.70	1.47

income distribution only.

The classification of incomes which was used

was based upon the reported income of the husband in 1920. This was not in all cases the income in the first year of marriage, and in theory it might have been better to have had income for all families at approximately

equal intervals after marriage. The practical difficulties of finding the income returns for non-census years, however, were prohibitive. Furthermore, in a period of rapidly changing wages and prices, the income figures for different calendar years would not have been at all comparable.

The computed fertility of the various specific income-education groups into which the material was divided is reported in Table 4. Making comparisons in both vertical and horizontal directions, one notices an increase in average fertility from the lower to the higher income categories, from the lower to the higher education groups. There would seem to be no advantage in trying to decide whether or not the income differences in fertility were more strongly marked than those for the education groups, there being no assurance, for example, that the gradation from education group A to group B is equivalent to the interval between the first and the second income categories. In point of view of the consistency of increase in fertility from one subgroup to the next, however, the education factor appears the more significant. In fact,

INCOME OF HUSBAND IN KRONOR	AGE OF WIFE AT MARRIAGE	EDUCATION OF HUSBAND			
		A	B	C+D	Total
Under 6,000 per annum	Under 25	1.37	1.59	1.83 ¹	1.42
	25-29	1.11	1.16	1.33 ¹	1.12
	30-34	0.87	0.88	0.73 ¹	0.87
6,000 or over per annum	Under 25	1.42	1.66	1.97	1.73
	25-29	1.19	1.46	1.61	1.43
	30-34	1.04	1.04	1.28	1.12

¹ Rates based on observations for less than 50 families.

Table 5. Average number of live births per family in the first ten years of marriage, according to education and income of husband and age of wife at marriage, in 6,629 Stockholm families.

as one proceeds from the lower to the higher income subdivisions within a given education group, no marked increase in fertility is noted until the 10,000 *kronor* level is reached. In contrast, a consistent increase in fertility with higher education is to be observed at each income level.

As a final precaution the income-education groups were further subdivided according to the age of the wives at marriage (Table 5). In spite of some necessary consolidation of the groups, the absolute numbers in some of the compartments became rather small but, from the consistency of the evidence alone, it was apparent that the fertility differences observed in the preceding tabulation (Table 4) did not depend on irregularities in the age distribution of the wives at the time of marriage. Insofar as may be established from the statistical evidence at hand, therefore, this factor of education was directly related to the intramarital fertility of the Stockholm families.

SUMMARY

The City of Stockholm appears to be one of the very few places in Western civilization where the "lower" social classes are less fertile than the "upper." The present article is a review of one section of a comprehensive investigation of this direct association of fertility and social status; it discusses the relative advantages of

degree of education as an index of social status and reports the observed relation of the husband's education to the fertility of marriage. The material used relates to a series of 6,629 families, formed in the years 1917 to 1920 inclusive and located in Stockholm both in 1920 and 1930, in which the wife was less than 35 years of age at marriage. The fertility studied is that of the first ten years of marriage, the information being obtained by a "double census" method which consists essentially of combining the fertility data of the 1930 census schedule with the 1920 report of social status in the early years of marriage. The principal findings may be summarized as follows:

1. There was a regular rise in fertility from the lowest to the highest education group in every age-of-wife-at-marriage group.

2. The direct association of education and fertility was not the result of temporary changes in the relative fertility of the groups in the early years of the study period (1917-1930).

3. This unusual relationship of fertility and education appeared to be in no way a result of the high illegitimate birth rate in Stockholm, nor of group differences in the number of children born to the wives in earlier marriages.

4. The greater fertility of the better educated persisted when the comparison was limited to roughly similar income classes; in fact, the differences in the fertility of the education groups appear to be even somewhat more distinctly marked than those of the income classes.

5. All of the available statistical evidence points to the fact that education itself was a primary variable, directly related to the fertility of marriage in Stockholm during the study period.

ANNOTATIONS

THE RELATION OF FERTILITY AND LONGEVITY IN MARRIED WOMEN DYING AFTER THE CHILDBEARING PERIOD

Do women who have borne many children live longer after the childbearing period than those who have been less fertile? It has been argued that the vitality reflected by high fertility predisposes to longevity. With equal force, it has also been held that the debilitating effect of frequent childbearing must curtail the length of life.

Until recently the numerous statistical approaches to the problem have suggested that fertility and longevity are positively correlated, but the evidence submitted has been scarcely more convincing than the earlier *a priori* pronouncements. Students of the subject, on finding an apparent direct association, have been over-willing to accept their results at face value. Little account has been taken of the inadequacy of the data used or of the influence of such factors as the differences in age at marriage and changes in birth rate during the period of investigation.

Miss Freeman recently has published the results of a critical study of the subject.¹ After careful analysis of her material, she concludes: "There probably is a low positive correlation between the duration of life and the number of offspring born, in married women who have survived the reproductive period. . . . However, the correlations are of such a low order that the changes in the mean duration of life associated with increasing numbers of offspring are of no practical importance."

This conclusion, interesting for its own sake, has an important bearing on the study of past trends of fertility from data relating to the total number of children born to surviving groups of married women. Such data permit the calculation of the mean number of offspring for women of any specified age at the time of enumeration. Since the childbearing period is virtually over at 45 years of age, it is possible from them to compare the fertility of women 45 years of age with that of any older group, for example, of women 75 years old whose families were completed

¹ Freeman, Bettie C.: Fertility and Longevity in Married Women Dying after the End of the Reproductive Period. *Human Biology*, September, 1935, vii, No. 3, pp. 392-418.

thirty years earlier. Thus, material collected in 1900, 1910, and 1911 has been utilized to study fertility trends during the last quarter of the nineteenth century. The validity of the procedure rests on the assumption that the ability to survive to the older ages is not itself correlated with fertility and, therefore, that the average number of children born to women of advancing age is representative of the completed fertility of the entire cohort from which they have survived.² This assumption Miss Freeman now finds to be valid for all practical purposes.

The study is based on the marital histories of 2,614 women who died at 45 or more years of age, obtained from eleven published genealogies of families living principally in the northeastern part of the United States. In order to secure as homogeneous a sample as possible, the only records utilized were those for women born at least eighty-five years before the compilation of the records, who were married only once and that before they were 45 years of age, whose husbands were known to be alive when the women were 45, and for whom the age at death, age at marriage, and the total number of offspring were known. The women were born in the period 1625-1825.

Material for these groups was analyzed separately for three time periods and four age-at-marriage groups, and finally for each age-at-marriage group of each time period. After pointing to the probability of a low positive correlation between the duration of life after the childbearing period and the number of offspring, the author notes that for women married under twenty years of age the correlation appears to be slightly higher than for those married later in life. "In general," she concludes, "this study gives no evidence that the association between the two variables [length of life after age 45 and number of offspring] is of sufficient moment to play a significant part in affecting population movements."

FRANK W. NOTESTEIN

² For examples of studies in which this problem arises, see: FERTILITY OF MARRIAGE. Census of England and Wales, 1911. His Majesty's Stationery Office, London, 1923, XIII, Part II, pp. xciv ff.

Notestein, Frank W.: The Decrease in the Size of Families from 1890-1910. Milbank Memorial Fund *Quarterly Bulletin*, October, 1931, ix, No. 4, pp. 181-188.

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Sallume, Xarifa and Notestein, Frank W.: Trends in the Size of Families Completed Prior to 1910 in Various Social Classes. *American Journal of Sociology*, November, 1932, xxxviii, No. 3, pp. 398-408.

HUMAN SURVIVORSHIP

MODERN developments in vital statistics, which have replaced static descriptions of births and deaths by an analysis of the dynamics of population change, have for a number of years received great impetus from the work of Dr. Dublin and Dr. Lotka of the Metropolitan Life Insurance Company. Their new book *LENGTH OF LIFE*¹ assembles the results of a number of their studies in this field, together with some of the pertinent results of other workers, coordinating the description of the risk of death with some of its implications for the population and its future. Curiosity about the chance of dying is almost universal, but it is an unusual book which presents a large body of evidence on the subject in such an interesting way that it catches the imagination and stimulates further speculation. Although written primarily for the person actively interested in some phase of medical or public health problems, the discussion is for the most part presented in nontechnical language, and the book will appeal to the general reader as well as to the specialist.

Throughout the book, the life table is used to describe the length of life and at the outset the life table functions are defined and explained with great clarity. The detailed procedure of computing a life table is left to the final chapter, where the methods of King for an abridged or complete life table, and of Jenkins for a complete life table are fully presented with arithmetic examples to illustrate the application of the formulas. The preliminary description of the life table is, however, entirely adequate to permit a person quite unfamiliar with the procedure of its construction to follow the book with complete understanding.

The history of human beings with regard to length of life is traced over a period of 2,000 years, during which a continual improvement in length of survivorship has been achieved. The evidence on the subject is necessarily decidedly sketchy over a large part of this period, but the increase in the average duration of life is impressive even during the recent period for which reliable records are available. Life tables for white males and for white females in the United States, 1929 to 1931, are used as a base line of comparison and the change in the mortality within the present century is analyzed to show the contrasting behavior of the population of different age groups and for different causes of death, with regard to time trends in mortality rates.

¹ Dublin, Louis I. and Lotka, Alfred J.: *LENGTH OF LIFE*. New York, The Ronald Press, 1936. 400 pp. \$5.00.

The force of mortality from the principal causes is further studied by breaking up the life table into the leading cause groups, thus forming sublife tables showing the ages to which persons destined to die of a particular cause may be expected to survive. This analysis would be of great importance to the individual and his insurance company if it could be foretold what cause of death would be written on his certificate, but it is of considerable general interest in presenting in very picturesque form the relationship between age of death and certain cause groups. It is stated (page 121) that the nine principal causes thus described, although a mere handful out of the 200 main causes of death in the official list, are responsible for about seven-tenths of all the deaths in the population. This statement is somewhat misleading for the nine "causes" are actually groups including in all about fifty of the 200 official main causes.

The risk of dying at various ages is further related to such factors as geographical location, inheritance of longevity, physical impairments, occupation, and advances in medical science. A chapter is devoted to each of these topics and a number of tables are presented containing valuable evidence on them, such as, to cite only two, the death rates of policy-holders according to the longevity of their parents, and the expectation of life of persons in various occupational classes. In a book dealing with so many phases of mortality studies, the space devoted to each of these broad fields obviously does not permit an exhaustive discussion of them, and some of the conclusions must be taken as merely suggestive. In the treatment of the contributions of medical science, for example, the problem confronting the medical profession seems to be over-simplified, resulting in an undue optimism. Thus in discussing diphtheria, the authors feel (page 167) that if the disease is not practically eliminated within a short time, "then we do not know how to follow up our victories," but this implies a constancy in the powers of our foe, which recent evidence would lead us to doubt. Throughout the discussion of disease, natural evolution of the causative agent and its relation to man, is not suggested as a cause either of the gratifying decline observed in some diseases or of the increase in others, and the possible appearance of new disease entities is not considered.

These somewhat general discussions are followed by an explicit treatment of certain problems in the field of population growth. The application of the life table to the analysis of these problems brings out the

effect of the changing schedule of mortality on the rate of growth of the population, its age constitution, and its social and economic trends. This section of the book is of particular interest not only to the specialist in population studies but to the general person who is interested in the structure and problems of the society in which he lives. Its implications are of decided importance for the formation of any sound program of social planning.

The appendix to the book contains a very valuable collection of life tables. In addition to the life tables for the United States, 1929-1931, given in the text, the *American Experience Table* and the *American Men Ultimate Table* are given in complete form, and more than five hundred abridged tables are given, the complete expectation of life, and in some cases q_x values, being tabulated at decennial years. In the opinion of this reviewer, the collection of tables would be of wider use if for a smaller number of tables some function of the life table were tabulated at yearly intervals, or if for the abridged tables, q_x had been the function selected for tabulation in every case. A bibliography of the principal tables and a comprehensive index of text and tables are included.

Those who have followed the work of Dr. Dublin and Dr. Lotka in the past will very much appreciate this valuable collection of their studies and their new readers will find in it a wealth of interesting ideas.

MARGARET MERRELL

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A MANUAL OF THE COMMON CONTAGIOUS DISEASES¹

THIS is an exceedingly compact manual of the common contagious diseases and should be exceedingly useful to practicing physicians and health officers who wish to review rapidly the salient facts about the diagnosis and treatment of one or another of these ailments. One rarely finds such extensive clinical data in such compact and accessible form. There are, in addition, valuable and concise sections on the diagnosis and prevention of serum reactions, technique of vaccination, and on the general management of communicable diseases at home, in the hospital, and elsewhere.

¹ Stimson, Philip Moen, M.D.: A MANUAL OF THE COMMON CONTAGIOUS DISEASES. Philadelphia, Lea and Febiger, 1936, 437 pages. \$4.00.

From the point of view of the practitioner of *preventive* medicine, the book gives very adequately the basic facts underlying prophylaxis, but the preventive measures listed are applicable more often than not to conditions in large cities only. There are some minor faults of the book which, if given some space here, should not be regarded as seriously detracting from the merit of a useful book.

In the first place, the fatality data upon which the practitioner relies for one most important prognostic point are based for the most part upon hospital experience at the Willard Parker. The result is the fatality of a highly selected group. Thus, in discussing whooping cough, the author states that "in children under the age of twelve months, whooping cough is fatal in 20 to 35 per cent of hospital cases." Out of 171 cases under the age of one year which were recorded in various morbidity surveys performed under the direction of the United States Public Health Service and the Committee on the Costs of Medical Care, there were only three deaths from whooping cough and its complications—a fatality rate for children under one year of only 1.8 per cent.

The young practitioner, fresh from his hospital internship and learning his prognosis from texts based on hospital experience, is often somewhat confused by the conditions which he encounters in private practice.

In the discussion on the Schick test, there is an implication that the removal of tonsils alters the Schick reaction in the statement: "In private practice the Schick test is used principally to determine whether or not immunization, as by the administration of toxin antitoxin, by an attack of the disease, or by tonsillectomy, has been accomplished." Published studies to date do not lend much credence to the earlier expressed views that tonsillectomy significantly influences the Schick reaction.

These are, however, minor criticisms of a worthy book.

RALPH E. WHEELER, M. D.

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THE ART OF PUBLIC HEALTH NURSING¹

THE emphasis in this book is put upon the human aspects of service, pointing out the need for public health nurses to have a deeper

¹ Bryan, Edith S., M.A., Ph.D., R.N.: THE ART OF PUBLIC HEALTH NURSING. Philadelphia, W. B. Saunders Co., 1935, 282 pp. \$2.00.

understanding of people and an appreciation of the heritage of all racial groups. From her several years' experience as a teacher of university students, the author believes that technical training is not sufficient for the public health nurse and advises that her preparation should include a broad general and cultural education. The development of those qualities of personality which assist the nurse in working with all types of people is also stressed.

In the chapters dealing with the duties of an infant welfare nurse, a school nurse, and an industrial nurse, which are discussed in much detail, it is emphasized again that the successful nurse is one who has a genuine love of people. These chapters are of value to the experienced nurse already working in one or all of these fields, and of equal importance to the beginner who might easily overlook the significance of the family health problem or the general community health program.

There are chapters explaining the need for definite organization of lay people to assist the nurse in establishing her program. Even further discussion of this subject would be timely, for there is increasing realization that the interest and participation of the people of the community largely determine the success and the stage of progress of the health program. There are also suggestions given for ways in which the public health nurse can cooperate with existing local, state, and national agencies.

This book furnishes excellent supplementary reading for beginning students in public health nursing courses. It is also of interest to advanced students because of the many illustrations of practical ways of working and of methods of teaching. The book has an exceptionally good title.

MARIAN G. RANDALL, R.N.